

CONTAINS NO CBI



Form Approved  
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OFFICE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Comprehensive Assessment Information Rule  
REPORTING FORM

When completed, send this form to:

Document Processing Center  
Office of Toxic Substances, TS-790  
U.S. Environmental Protection Agency  
401 M Street, SW  
Washington, DC 20460  
Attention: CAIR Reporting Office

For Agency Use Only:

Date of Receipt: \_\_\_\_\_

Document  
Control Number: \_\_\_\_\_

Docket Number: \_\_\_\_\_

SECTION 1 GENERAL MANUFACTURER, IMPORTER, AND PROCESSOR INFORMATION

PART A GENERAL REPORTING INFORMATION

1.01 This Comprehensive Assessment Information Rule (CAIR) Reporting Form has been completed in response to the Federal Register Notice of..... 12 22 88  
CBI mo. day year

☐ a. If a Chemical Abstracts Service Number (CAS No.) is provided in the Federal Register, list the CAS No. .... 026471-62-5

b. If a chemical substance CAS No. is not provided in the Federal Register, list either (i) the chemical name, (ii) the mixture name, or (iii) the trade name of the chemical substance as provided in the Federal Register.

(i) Chemical name as listed in the rule ..... N/A

(ii) Name of mixture as listed in the rule ....

(iii) Trade name as listed in the rule .....

c. If a chemical category is provided in the Federal Register, report the name of the category as listed in the rule, the chemical substance CAS No. you are reporting on which falls under the listed category, and the chemical name of the substance you are reporting on which falls under the listed category.

Name of category as listed in the rule ..... N/A

CAS No. of chemical substance .....             -    -  

Name of chemical substance .....

1.02 Identify your reporting status under CAIR by circling the appropriate response(s).

CBI Manufacturer ..... 1

☐ Importer ..... 2

Processor ..... 3

X/P manufacturer reporting for customer who is a processor ..... 4

X/P processor reporting for customer who is a processor ..... 5

☐ Mark (X) this box if you attach a continuation sheet.

1.03 Does the substance you are reporting on have an "x/p" designation associated with it in the above-listed Federal Register Notice?

CBI

- ☐ Yes ..... ☒ Go to question 1.04
- ☐ No ..... ☐ Go to question 1.05

1.04 a. Do you manufacture, import, or process the listed substance and distribute it under a trade name(s) different than that listed in the Federal Register Notice? Circle the appropriate response.

CBI

- ☐ Yes ..... 1
- ☐ No ..... 2

b. Check the appropriate box below:

☒ You have chosen to notify your customers of their reporting obligations

Provide the trade name(s) .... Listed on continuation

Sheet page 1

☐ You have chosen to report for your customers

☐ You have submitted the trade name(s) to EPA one day after the effective date of the rule in the Federal Register Notice under which you are reporting.

1.05 If you buy a trade name product and are reporting because you were notified of your reporting requirements by your trade name supplier, provide that trade name.

CBI

☐ Trade name ..... Rubinate TDI 80/20

Is the trade name product a mixture? Circle the appropriate response.

Yes ..... 1

No ..... 2

1.06 Certification -- The person who is responsible for the completion of this form must sign the certification statement below:

CBI

☐ "I hereby certify that, to the best of my knowledge and belief, all information entered on this form is complete and accurate."

Gary G. Maxwell  
NAME

  
SIGNATURE

June 30, 1989  
DATE SIGNED

Environmental Coordinator  
TITLE

( 301 ) 392-4800  
TELEPHONE NO.

☒ Mark (X) this box if you attach a continuation sheet.

1.07 Exemptions From Reporting -- If you have provided EPA or another Federal agency with the required information on a CAIR Reporting Form for the listed substance within the past 3 years, and this information is current, accurate, and complete for the time period specified in the rule, then sign the certification below. You are required to complete section 1 of this CAIR form and provide any information now required but not previously submitted. Provide a copy of any previous submissions along with your Section 1 submission.

CBI

☐

"I hereby certify that, to the best of my knowledge and belief, all required information which I have not included in this CAIR Reporting Form has been submitted to EPA within the past 3 years and is current, accurate, and complete for the time period specified in the rule."

<u>(N/A)</u>	_____	_____	_____
	NAME	SIGNATURE	DATE SIGNED
_____	( )	_____	_____
TITLE		TELEPHONE NO.	DATE OF PREVIOUS SUBMISSION

1.08 CBI Certification -- If you have asserted any CBI claims in this report you must certify that the following statements truthfully and accurately apply to all of those confidentiality claims which you have asserted.

CBI

☐

"My company has taken measures to protect the confidentiality of the information, and it will continue to take these measures; the information is not, and has not been, reasonably ascertainable by other persons (other than government bodies) by using legitimate means (other than discovery based on a showing of special need in a judicial or quasi-judicial proceeding) without my company's consent; the information is not publicly available elsewhere; and disclosure of the information would cause substantial harm to my company's competitive position."

<u>(N/A)</u>	_____	_____	_____
	NAME	SIGNATURE	DATE SIGNED
_____	( )	_____	_____
TITLE		TELEPHONE NO.	

☐ Mark (X) this box if you attach a continuation sheet.



### 1.09 Facility Identification

Dun & Bradstreet Number .....[0]7-[6]19-[1]519

EPA ID Number .....MDR..[9]81106081

Employer ID Number .....2.[1]9214815

Primary Standard Industrial Classification (SIC) Code .....[2]821

Other SIC Code .....[ ][ ][ ]

Other SIC Code .....[ ][ ][ ]

Dun & Bradstreet Number .....[0][7]-[6][1][9]-[1][5][1][9]

Employer ID Number .....2.[1][9][2][1][4][8][1][5]

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### 1.11 Parent Company Identification

CBI    Name   [P][M][C], [I][N][C] \_\_\_\_\_  
[ ] Address   [I][2][2][4][3] [B][R][A][N][F][O][R][D] [S][T] [P][O][B][I][3][6][7]  
                        Street  
               [S][U][N] [V][A][L][L][E][Y] \_\_\_\_\_  
                        City  
                    [C][A]    [9][1][3][5][2]--[1][3][6][7]  
                        State               Zip

**Dun & Bradstreet Number** .....[0][7]-[6][1][9]-[1][5][1][9]

### 1.12 Technical Contact

[illegible]

Telephone Number ..... [ 3 ] [ 0 ] [ 1 ] - [ 3 ] [ 9 ] [ 2 ] - [ 4 ] [ 8 ] [ 0 ] [ 0 ]

1.13 This reporting year is from ..... [0][1] [8][8] to [1][2] [8][8]  
Mo. Year Mo. Year

☐ Mark (X) this box if you attach a continuation sheet.

[illegible][illegible]

8

1.16 For each classification listed below, state the quantity of the listed substance that was manufactured, imported, or processed at your facility during the reporting year.

<u>CBI</u>	<u>Classification</u>	<u>Quantity (kg/yr)</u>
<input type="checkbox"/>	Manufactured .....	N/A
	Imported .....	N/A
	Processed (include quantity repackaged) .....	142,083
Of that quantity manufactured or imported, report that quantity:		
	In storage at the beginning of the reporting year .....	N/A
	For on-site use or processing .....	N/A
	For direct commercial distribution (including export) .....	N/A
	In storage at the end of the reporting year .....	N/A
Of that quantity processed, report that quantity:		
	In storage at the beginning of the reporting year .....	17,398
	Processed as a reactant (chemical producer) .....	142,083
	Processed as a formulation component (mixture producer) .....	N/A
	Processed as an article component (article producer) .....	N/A
	Repackaged (including export) .....	N/A
	In storage at the end of the reporting year .....	5,354

☐ Mark (X) this box if you attach a continuation sheet.

1.17 Mixture -- If the listed substance on which you are required to report is a mixture or a component of a mixture, provide the following information for each component chemical. (If the mixture composition is variable, report an average percentage of each component chemical for all formulations.)

[ ]

☐ Mark (X) this box if you attach a continuation sheet.

**CBI**

Quantity processed .....	220,190	kg
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**CBI**

☐ Mark (X) this box if you attach a continuation sheet.

2.06 Specify the manner in which you processed the listed substance. Circle all appropriate process types.

- ☐ Continuous process ..... 1
- ☐ Semicontinuous process ..... 2
- ☐ Batch process ..... 3

2.07 State your facility's name-plate capacity for manufacturing or processing the listed substance. (If you are a batch manufacturer or batch processor, do not answer this question.)

- ☐ ☒ N/A
- ☐ Manufacturing capacity ..... kg/yr
- ☐ Processing capacity ..... kg/yr

2.08 If you intend to increase or decrease the quantity of the listed substance manufactured, imported, or processed at any time after your current corporate fiscal year, estimate the increase or decrease based upon the reporting year's production volume.

<input type="checkbox"/>	Manufacturing Quantity (kg)	Importing Quantity (kg)	Processing Quantity (kg)
Amount of increase			0
Amount of decrease			UK

☐ Mark (X) this box if you attach a continuation sheet.

2.09 For the three largest volume manufacturing or processing process types involving the listed substance, specify the number of days you manufactured or processed the listed substance during the reporting year. Also specify the average number of hours per day each process type was operated. (If only one or two operations are involved, list those.)

CBI

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Days/Year      Average  
Hours/Day

Process Type #1 (The process type involving the largest quantity of the listed substance.)

Manufactured ..... N/A      \_\_\_\_\_

Processed ..... 150      6

Process Type #2 (The process type involving the 2nd largest quantity of the listed substance.)

Manufactured ..... N/A      \_\_\_\_\_

Processed ..... N/A      \_\_\_\_\_

Process Type #3 (The process type involving the 3rd largest quantity of the listed substance.)

Manufactured ..... N/A      \_\_\_\_\_

Processed ..... N/A      \_\_\_\_\_

2.10 State the maximum daily inventory and average monthly inventory of the listed substance that was stored on-site during the reporting year in the form of a bulk chemical.

CBI

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Maximum daily inventory ..... \_\_\_\_\_ kg

Average monthly inventory ..... \_\_\_\_\_ kg

☐ Mark (X) this box if you attach a continuation sheet.



2.11 **Related Product Types** -- List any byproducts, coproducts, or impurities present with the listed substance in concentrations greater than 0.1 percent as it is manufactured, imported, or processed. The source of byproducts, coproducts, or impurities means the source from which the byproducts, coproducts, or impurities are made or introduced into the product (e.g., carryover from raw material, reaction product, etc.).

CBI

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<u>CAS No.</u>	<u>Chemical Name</u>	<u>Byproduct, Coproduct or Impurity<sup>1</sup></u>	<u>Concentration (%) (specify ± % precision)</u>	<u>Source of By-products, Coproducts, or Impurities</u>
<u>N/A</u>				

<sup>1</sup>Use the following codes to designate byproduct, coproduct, or impurity:

B = Byproduct  
C = Coproduct  
I = Impurity

☐ Mark (X) this box if you attach a continuation sheet.

- 2.12 Existing Product Types -- List all existing product types which you manufactured, imported, or processed using the listed substance during the reporting year. List the quantity of listed substance you use for each product type as a percentage of the total volume of listed substance used during the reporting year. Also list the quantity of listed substance used captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.)

CBI

☐

a.	b.	c.	d.
Product Types <sup>1</sup>	% of Quantity Manufactured, Imported, or Processed	% of Quantity Used Captively On-Site	Type of End-Users <sup>2</sup>
K	12.2	0	I
L	87.8	0	I

<sup>1</sup>Use the following codes to designate product types:

A = Solvent	L = Moldable/Castable/Rubber and additives
B = Synthetic reactant	M = Plasticizer
C = Catalyst/Initiator/Accelerator/ Sensitizer	N = Dye/Pigment/Colorant/Ink and additives
D = Inhibitor/Stabilizer/Scavenger/ Antioxidant	O = Photographic/Reprographic chemical and additives
E = Analytical reagent	P = Electrodeposition/Plating chemicals
F = Chelator/Coagulant/Sequestrant	Q = Fuel and fuel additives
G = Cleanser/Detergent/Degreaser	R = Explosive chemicals and additives
H = Lubricant/Friction modifier/Antiwear agent	S = Fragrance/Flavor chemicals
I = Surfactant/Emulsifier	T = Pollution control chemicals
J = Flame retardant	U = Functional fluids and additives
K = Coating/Binder/Adhesive and additives	V = Metal alloy and additives
	W = Rheological modifier
	X = Other (specify) _____

<sup>2</sup>Use the following codes to designate the type of end-users:

I = Industrial	CS = Consumer
CM = Commercial	H = Other (specify) _____

☐ Mark (X) this box if you attach a continuation sheet.

- 2.13 Expected Product Types -- Identify all product types which you expect to manufacture, import, or process using the listed substance at any time after your current corporate fiscal year. For each use, specify the quantity you expect to manufacture, import, or process for each use as a percentage of the total volume of listed substance used during the reporting year. Also list the quantity of listed substance used captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.)

CBI

☐

a.	b.	c.	d.
Product Types <sup>1</sup>	% of Quantity Manufactured, Imported, or Processed	% of Quantity Used Captively On-Site	Type of End-Users <sup>2</sup>
K	15	0	I
L	85	0	I

<sup>1</sup>Use the following codes to designate product types:

A = Solvent	L = Moldable/Castable/Rubber and additives
B = Synthetic reactant	M = Plasticizer
C = Catalyst/Initiator/Accelerator/Sensitizer	N = Dye/Pigment/Colorant/Ink and additives
D = Inhibitor/Stabilizer/Scavenger/Antioxidant	O = Photographic/Reprographic chemical and additives
E = Analytical reagent	P = Electrodeposition/Plating chemicals
F = Chelator/Coagulant/Sequestrant	Q = Fuel and fuel additives
G = Cleanser/Detergent/Degreaser	R = Explosive chemicals and additives
H = Lubricant/Friction modifier/Antiwear agent	S = Fragrance/Flavor chemicals
I = Surfactant/Emulsifier	T = Pollution control chemicals
J = Flame retardant	U = Functional fluids and additives
K = Coating/Binder/Adhesive and additives	V = Metal alloy and additives
	W = Rheological modifier
	X = Other (specify) _____

<sup>2</sup>Use the following codes to designate the type of end-users:

I = Industrial	CS = Consumer
CM = Commercial	H = Other (specify) _____

☐ Mark (X) this box if you attach a continuation sheet.

2.14 Final Product -- Complete the following table for each type of final product manufactured, imported, or processed at your facility that contains the listed substance other than as an impurity.

☐

a.	b.	c.	d.
Product Type <sup>1</sup>	Final Product's Physical Form <sup>2</sup>	Average % Composition of Listed Substance in Final Product	Type of End-Users <sup>3</sup>
K	B	30	I
L	B	43	I

<sup>1</sup>Use the following codes to designate product types:

A = Solvent	L = Moldable/Castable/Rubber and additives
B = Synthetic reactant	M = Plasticizer
C = Catalyst/Initiator/Accelerator/ Sensitizer	N = Dye/Pigment/Colorant/Ink and additives
D = Inhibitor/Stabilizer/Scavenger/ Antioxidant	O = Photographic/Reprographic chemical and additives
E = Analytical reagent	P = Electrodeposition/Plating chemicals
F = Chelator/Coagulant/Sequestrant	Q = Fuel and fuel additives
G = Cleanser/Detergent/Degreaser	R = Explosive chemicals and additives
H = Lubricant/Friction modifier/Antiwear agent	S = Fragrance/Flavor chemicals
I = Surfactant/Emulsifier	T = Pollution control chemicals
J = Flame retardant	U = Functional fluids and additives
K = Coating/Binder/Adhesive and additives	V = Metal alloy and additives
	W = Rheological modifier
	X = Other (specify) _____

<sup>2</sup>Use the following codes to designate the final product's physical form:

A = Gas	F2 = Crystalline solid
B = Liquid	F3 = Granules
C = Aqueous solution	F4 = Other solid
D = Paste	G = Gel
E = Slurry	H = Other (specify) _____
F1 = Powder	

<sup>3</sup>Use the following codes to designate the type of end-users:

I = Industrial	CS = Consumer
CM = Commercial	H = Other (specify) _____

☐ Mark (X) this box if you attach a continuation sheet.

2.15 Circle all applicable modes of transportation used to deliver bulk shipments of the  
CBI listed substance to off-site customers.

☐ Truck ..... 1  
Railcar ..... 2  
Barge, Vessel ..... 3  
Pipeline ..... 4  
Plane ..... 5  
Other (specify) ..... 6

2.16 Customer Use -- Estimate the quantity of the listed substance used by your customers  
CBI or prepared by your customers during the reporting year for use under each category  
of end use listed (i-iv).

☐

Category of End Use

i. Industrial Products

Chemical or mixture ..... 16,000 kg/yr  
Article ..... N/A kg/yr

ii. Commercial Products

Chemical or mixture ..... N/A kg/yr  
Article ..... N/A kg/yr

iii. Consumer Products

Chemical or mixture ..... N/A kg/yr  
Article ..... N/A kg/yr

iv. Other

Distribution (excluding export) ..... N/A kg/yr  
Export ..... N/A kg/yr  
Quantity of substance consumed as reactant ..... 126,083 kg/yr  
Unknown customer uses ..... NA kg/yr

☐ Mark (X) this box if you attach a continuation sheet.

## SECTION 3 PROCESSOR RAW MATERIAL IDENTIFICATION

### PART A GENERAL DATA

- 3.01 Specify the quantity purchased and the average price paid for the listed substance for each major source of supply listed. Product trades are treated as purchases.  
CBI The average price is the market value of the product that was traded for the listed substance.

☐

<u>Source of Supply</u>	<u>Quantity (kg)</u>	<u>Average Price (\$/kg)</u>
The listed substance was manufactured on-site.	NA	NA
The listed substance was transferred from a different company site.	NA	NA
The listed substance was purchased directly from a manufacturer or importer.	130,000	1.98
The listed substance was purchased from a distributor or repackager.	NA	NA
The listed substance was purchased from a mixture producer.	NA	NA

- 3.02 Circle all applicable modes of transportation used to deliver the listed substance to your facility.

☐

- Truck ..... ①
- Railcar ..... 2
- Barge, Vessel ..... 3
- Pipeline ..... 4
- Plane ..... 5
- Other (specify) \_\_\_\_\_ 6

☐ Mark (X) this box if you attach a continuation sheet.

3.03 a. Circle all applicable containers used to transport the listed substance to your facility.  
CBI

☐

Bags ..... 1  
Boxes ..... 2  
Free standing tank cylinders ..... 3  
Tank rail cars ..... 4  
Hopper cars ..... 5  
Tank trucks ..... 6  
Hopper trucks ..... 7  
Drums ..... 8  
Pipeline ..... 9  
Other (specify) ..... 10

b. If the listed substance is transported in pressurized tank cylinders, tank rail cars, or tank trucks, state the pressure of the tanks.

Tank cylinders ..... N/A mmHg  
Tank rail cars ..... N/A mmHg  
Tank trucks ..... N/A mmHg

☐ Mark (X) this box if you attach a continuation sheet.

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PART B RAW MATERIAL IN THE FORM OF A MIXTURE

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3.04 If you obtain the listed substance in the form of a mixture, list the trade name(s) of the mixture, the name of its supplier(s) or manufacturer(s), an estimate of the average percent composition by weight of the listed substance in the mixture, and the amount of mixture processed during the reporting year.

CBI

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<u>Trade Name</u>	<u>Supplier or Manufacturer</u>	<u>Average % Composition by Weight (specify <math>\pm</math> % precision)</u>	<u>Amount Processed (kg/yr)</u>
<u>N/A</u>			

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☐ Mark (X) this box if you attach a continuation sheet.

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PART C RAW MATERIAL VOLUME

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3.05 State the quantity of the listed substance used as a raw material during the CBI reporting year in the form of a class I chemical, class II chemical, or polymer, and the percent composition, by weight, of the listed substance.

☐

	Quantity Used (kg/yr)	% Composition by Weight of Listed Sub- stance in Raw Material (specify $\pm$ % precision)
Class I chemical	142,083	100
Class II chemical	NA	
Polymer	NA	

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☐ Mark (X) this box if you attach a continuation sheet.

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## SECTION 4 PHYSICAL/CHEMICAL PROPERTIES

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### General Instructions:

If you are reporting on a mixture as defined in the glossary, reply to questions in Section 4 that are inappropriate to mixtures by stating "NA -- mixture."

For questions 4.06-4.15, if you possess any hazard warning statement, label, MSDS, or other notice that addresses the information requested, you may submit a copy or reasonable facsimile in lieu of answering those questions which it addresses.

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### PART A PHYSICAL/CHEMICAL DATA SUMMARY

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- 4.01 Specify the percent purity for the three major<sup>1</sup> technical grade(s) of the listed substance as it is manufactured, imported, or processed. Measure the purity of the substance in the final product form for manufacturing activities, at the time you import the substance, or at the point you begin to process the substance.

CBI

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	<u>Manufacture</u>	<u>Import</u>	<u>Process</u>
Technical grade #1	<u>N/A</u> % purity	<u>N/A</u> % purity	<u>100</u> % purity
Technical grade #2	<u>N/A</u> % purity	<u>N/A</u> % purity	<u>N/A</u> % purity
Technical grade #3	<u>N/A</u> % purity	<u>N/A</u> % purity	<u>N/A</u> % purity

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<sup>1</sup>Major = Greatest quantity of listed substance manufactured, imported or processed.

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- 4.02 Submit your most recently updated Material Safety Data Sheet (MSDS) for the listed substance, and for every formulation containing the listed substance. If you possess an MSDS that you developed and an MSDS developed by a different source, submit your version. Indicate whether at least one MSDS has been submitted by circling the appropriate response.

Yes ..... ①

No ..... 2

Indicate whether the MSDS was developed by your company or by a different source.

Your company ..... ①

Another source ..... 2

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☒ Mark (X) this box if you attach a continuation sheet.

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4.03 Submit a copy or reasonable facsimile of any hazard information (other than an MSDS) that is provided to your customers/users regarding the listed substance or any formulation containing the listed substance. Indicate whether this information has been submitted by circling the appropriate response.

Yes ..... ☒ 1  
 No ..... 2

4.04 For each activity that uses the listed substance, circle all the applicable number(s) corresponding to each physical state of the listed substance during the activity listed. Physical states for importing and processing activities are determined at the time you import or begin to process the listed substance. Physical states for manufacturing, storage, disposal and transport activities are determined using the final state of the product.

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Activity	Physical State				
	Solid	Slurry	Liquid	Liquified Gas	Gas
Manufacture	1	2	3	4	5
Import	1	2	3	4	5
Process	1	2	<input checked="" type="radio"/> 3	4	5
Store	1	2	<input checked="" type="radio"/> 3	4	5
Dispose	1	2	<input checked="" type="radio"/> 3	4	5
Transport	1	2	<input checked="" type="radio"/> 3	4	5

☐ Mark (X) this box if you attach a continuation sheet.

4.05 Particle Size -- If the listed substance exists in particulate form during any of the following activities, indicate for each applicable physical state the size and the percentage distribution of the listed substance by activity. Do not include particles  $\geq 10$  microns in diameter. Measure the physical state and particle sizes for importing and processing activities at the time you import or begin to process the listed substance. Measure the physical state and particle sizes for manufacturing storage, disposal and transport activities using the final state of the product.

CBI  
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Physical State	(N/A)	Manufacture	Import	Process	Store	Dispose	Transport
Dust	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Powder	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Fiber	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Aerosol	<1 micron						
	1 to <5 microns						
	5 to <10 microns						

☐ Mark (X) this box if you attach a continuation sheet.

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SECTION 5 ENVIRONMENTAL FATE

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PART A RATE CONSTANTS AND TRANSFORMATION PRODUCTS

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5.01 Indicate the rate constants for the following transformation processes.

a. Photolysis:

Absorption spectrum coefficient (peak) .... NA (1/M cm) at \_\_\_\_\_ nm

Reaction quantum yield,  $\phi$  ..... NA at \_\_\_\_\_ nm

Direct photolysis rate constant,  $k_p$ , at ... NA 1/hr \_\_\_\_\_ latitude

b. Oxidation constants at 25°C:

For  $^1O_2$  (singlet oxygen),  $k_{ox}$  ..... NA 1/M hr

For  $RO_2$  (peroxy radical),  $k_{ox}$  ..... NA 1/M hr

c. Five-day biochemical oxygen demand,  $BOD_5$  ... NA mg/l

d. Biotransformation rate constant:

For bacterial transformation in water,  $k_b$ ... NA 1/hr

Specify culture ..... NA

e. Hydrolysis rate constants:

For base-promoted process,  $k_B$  ..... NA 1/M hr

For acid-promoted process,  $k_A$  ..... NA 1/M hr

For neutral process,  $k_N$  ..... NA 1/hr

f. Chemical reduction rate (specify conditions) NA

g. Other (such as spontaneous degradation) ... NA

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☐ Mark (X) this box if you attach a continuation sheet.

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**PART B PARTITION COEFFICIENTS**

5.02 a. Specify the half-life of the listed substance in the following media.

<u>Media</u>	<u>Half-life (specify units)</u>
Groundwater	NA
Atmosphere	NA
Surface water	NA
Soil	NA

b. Identify the listed substance's known transformation products that have a half-life greater than 24 hours.

<u>CAS No.</u>	<u>Name</u>	<u>Half-life (specify units)</u>	<u>Media</u>
NA			in
			in
			in
			in

5.03 Specify the octanol-water partition coefficient,  $K_{ow}$  ... NA at 25°C

Method of calculation or determination ..... NA

5.04 Specify the soil-water partition coefficient,  $K_d$  ..... NA at 25°C

Soil type ..... NA

5.05 Specify the organic carbon-water partition coefficient,  $K_{oc}$  ..... NA at 25°C

5.06 Specify the Henry's Law Constant,  $H$  ..... NA atm-m<sup>3</sup>/mole

☐ Mark (X) this box if you attach a continuation sheet.

5.07 List the bioconcentration factor (BCF) of the listed substance, the species for which it was determined, and the type of test used in deriving the BCF.

<u>Bioconcentration Factor</u>	<u>Species</u>	<u>Test</u> <sup>1</sup>
NA		

<sup>1</sup>Use the following codes to designate the type of test:

F = Flowthrough  
S = Static

☐ Mark (X) this box if you attach a continuation sheet.

6.04 For each market listed below, state the quantity sold and the total sales value of the listed substance sold or transferred in bulk during the reporting year.

☐

<u>Market</u>	<u>Quantity Sold or Transferred (kg/yr)</u>	<u>Total Sales Value (\$/yr)</u>
Retail sales		
Distribution -- Wholesalers		
Distribution -- Retailers		
Intra-company transfer		
Repackagers		
Mixture producers		
Article producers		
Other chemical manufacturers or processors		
Exporters		
Other (specify)		

6.05 Substitutes -- List all known commercially feasible substitutes that you know exist for the listed substance and state the cost of each substitute. A commercially feasible substitute is one which is economically and technologically feasible to use in your current operation, and which results in a final product with comparable performance in its end uses.

CBI

☐

<u>Substitute</u>	<u>Cost (\$/kg)</u>
NONE	

☐ Mark (X) this box if you attach a continuation sheet.



## SECTION 7 MANUFACTURING AND PROCESSING INFORMATION

### General Instructions:

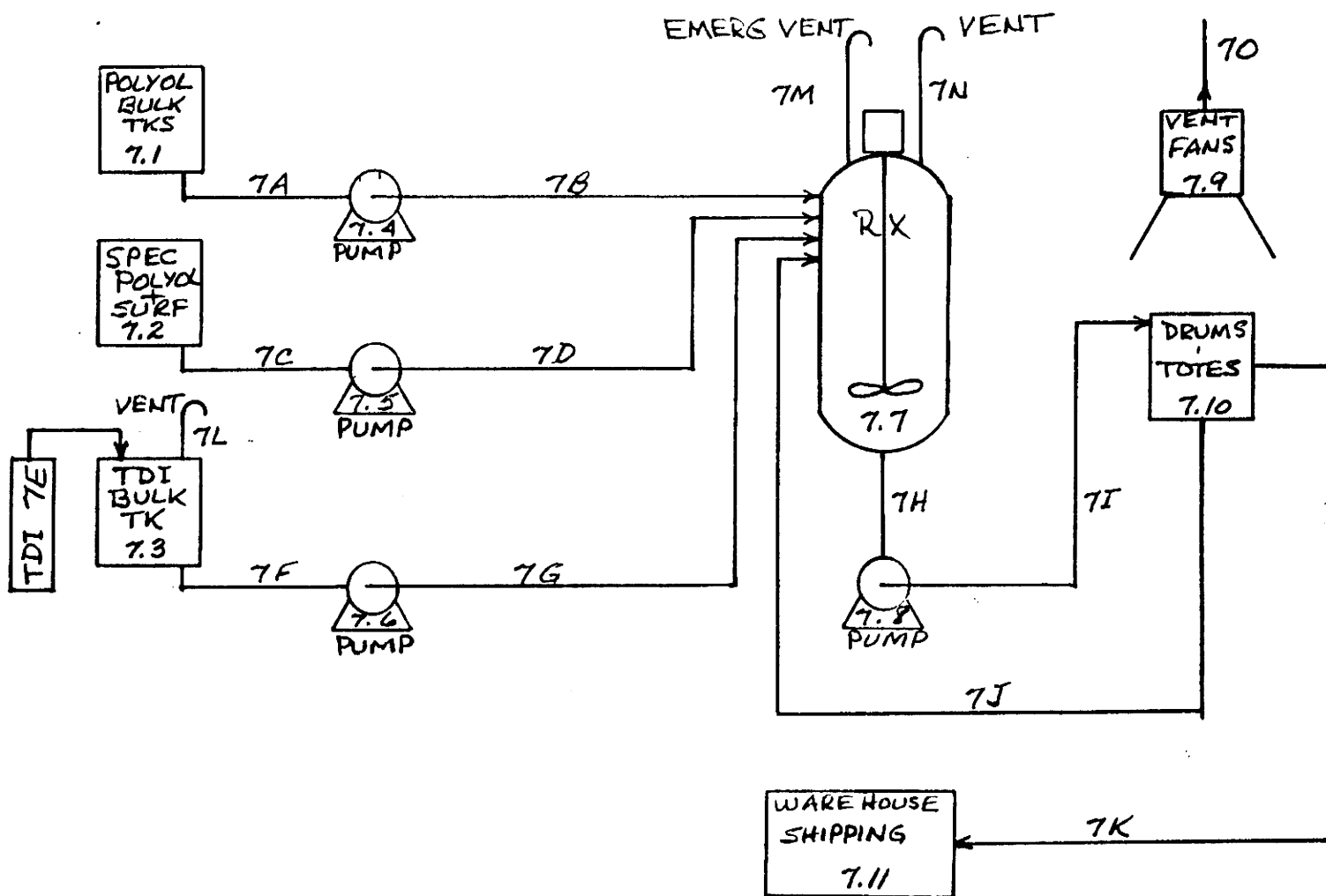
For questions 7.04-7.06, provide a separate response for each process block flow diagram provided in questions 7.01, 7.02, and 7.03. Identify the process type from which the information is extracted.

### PART A MANUFACTURING AND PROCESSING PROCESS TYPE DESCRIPTION

7.01 In accordance with the instructions, provide a process block flow diagram showing the major (greatest volume) process type involving the listed substance.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

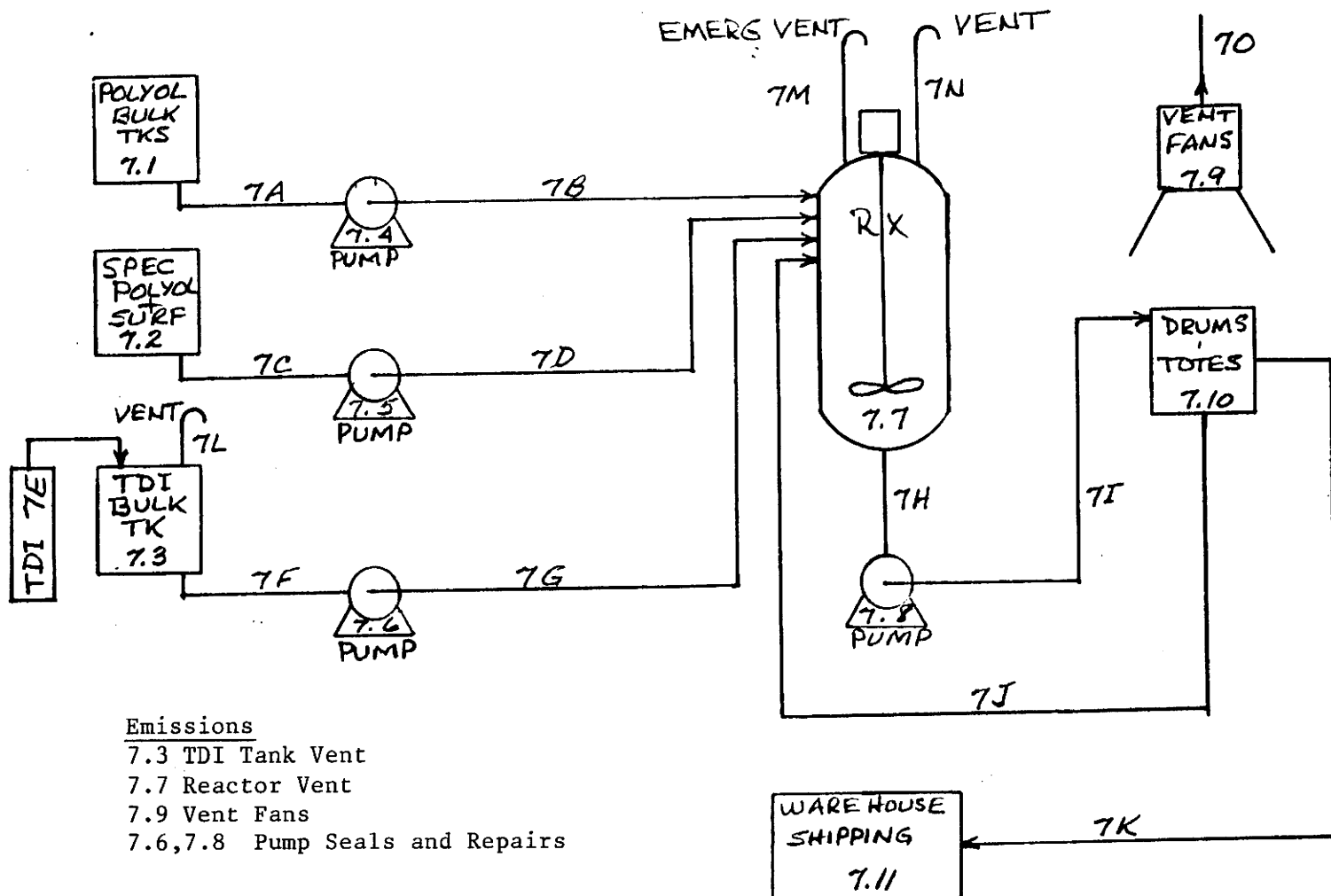


☐ Mark (X) this box if you attach a continuation sheet.

7.03 In accordance with the instructions, provide a process block flow diagram showing all process emission streams and emission points that contain the listed substance and which, if combined, would total at least 90 percent of all facility emissions if not treated before emission into the environment. If all such emissions are released from one process type, provide a process block flow diagram using the instructions for question 7.01. If all such emissions are released from more than one process type, provide a process block flow diagram showing each process type as a separate block.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS



☐ Mark (X) this box if you attach a continuation sheet.

7.04 Describe the typical equipment types for each unit operation identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

<u>Unit Operation ID Number</u>	<u>Typical Equipment Type</u>	<u>Operating Temperature Range (°C)</u>	<u>Operating Pressure Range (mm Hg)</u>	<u>Vessel Composition</u>
<u>7.1</u>	<u>STORAGE TK</u>	<u>40°C</u>	<u>ATMOS.</u>	<u>STEEL</u>
<u>7.2</u>	<u>DRUMS</u>	<u>AMBIENT</u>	<u>ATMOS.</u>	<u>STEEL</u>
<u>7.3</u>	<u>STORAGE TK</u>	<u>40°C</u>	<u>ATMOS.</u>	<u>STEEL</u>
<u>7.4</u>	<u>TRANSFER PMP</u>	<u>40°C</u>	<u>&lt;8000</u>	<u>STEEL</u>
<u>7.5</u>	<u>TRANSFER PMP</u>	<u>40°C</u>	<u>&lt;8000</u>	<u>STEEL</u>
<u>7.6</u>	<u>CAN PUMP</u>	<u>40°C</u>	<u>2000</u>	<u>STAINLESS STL.</u>
<u>7.7</u>	<u>REACTOR</u>	<u>AMB-120°C</u>	<u>700-1000</u>	<u>STAINLESS STL.</u>
<u>7.8</u>	<u>TRANSFER PUMP</u>	<u>AMB-120°C</u>	<u>&lt;8000</u>	<u>STEEL</u>
<u>7.9</u>	<u>RADIAL BLOWERS</u>	<u>AMB</u>	<u>ATMOS.</u>	<u>ALUM</u>
<u>7.10</u>	<u>DRUM NOZZ &amp; SCALE</u>	<u>AMB</u>	<u>ATMOS.</u>	<u>STEEL</u>
<u>7.11</u>	<u>ENCLOSED BLDG</u>	<u>AMB</u>	<u>ATMOS.</u>	<u>N/A</u>

☐ Mark (X) this box if you attach a continuation sheet.

7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

<u>Process Stream ID Code</u>	<u>Process Stream Description</u>	<u>Physical State<sup>1</sup></u>	<u>Stream Flow (kg/yr)</u>
<u>7E, 7F, 7G</u>	<u>TDI</u>	<u>OL</u>	<u>140,000</u>
<u>7A, 7B</u>	<u>POLYOL</u>	<u>OL</u>	<u>135,000</u>
<u>7C, 7D</u>	<u>POLYOL &amp; SURFACTANTS</u>	<u>OL</u>	<u>50,000</u>
<u>7H, 7I, 7K</u>	<u>PREPOLYMERS</u>	<u>OL</u>	<u>325,000</u>
<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
<u>7J</u>	<u>PREPOLYMER REWORK</u>	<u>OL</u>	<u>5,000</u>
<u>7L, 7M, 7N</u>	<u>TANK VENTS</u>	<u>GU</u>	<u>&lt;7</u>
<u>7O</u>	<u>LOCAL EXHAUST VENT</u>	<u>GU</u>	<u>NK</u>

<sup>1</sup>Use the following codes to designate the physical state for each process stream:

GC = Gas (condensable at ambient temperature and pressure)  
 GU = Gas (uncondensable at ambient temperature and pressure)  
 SO = Solid  
 SY = Sludge or slurry  
 AL = Aqueous liquid  
 OL = Organic liquid  
 IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

☐ Mark (X) this box if you attach a continuation sheet.

7.06 Characterize each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the CBI instructions for further explanation and an example.)

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

a.	b.	c.	d.	e.
Process Stream ID Code	Known Compounds <sup>1</sup>	Concentrations <sup>2,3</sup> (% or ppm)	Other Expected Compounds HYDROLYZABLE	Estimated Concentrations (% or ppm)
7A	TDI	99.9% AW	CHLORINE	100 PPM AW
7C	SPECIAL POLYOLS	0-25% EW	NA	NA
	SURFACTANT	0-1% EW	NA	
	FLUOROCARBON	0-5% EW	NA	NA
7F	POLYETHER POLYOLS	100% EW	NA	NA

7.06 continued below

☐ Mark (X) this box if you attach a continuation sheet.

7.06 (continued)

<sup>1</sup>For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column b. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1		
N/A		
2		
3		
4		
5		

<sup>2</sup>Use the following codes to designate how the concentration was determined:

A = Analytical result  
E = Engineering judgement/calculation

<sup>3</sup>Use the following codes to designate how the concentration was measured:

V = Volume  
W = Weight

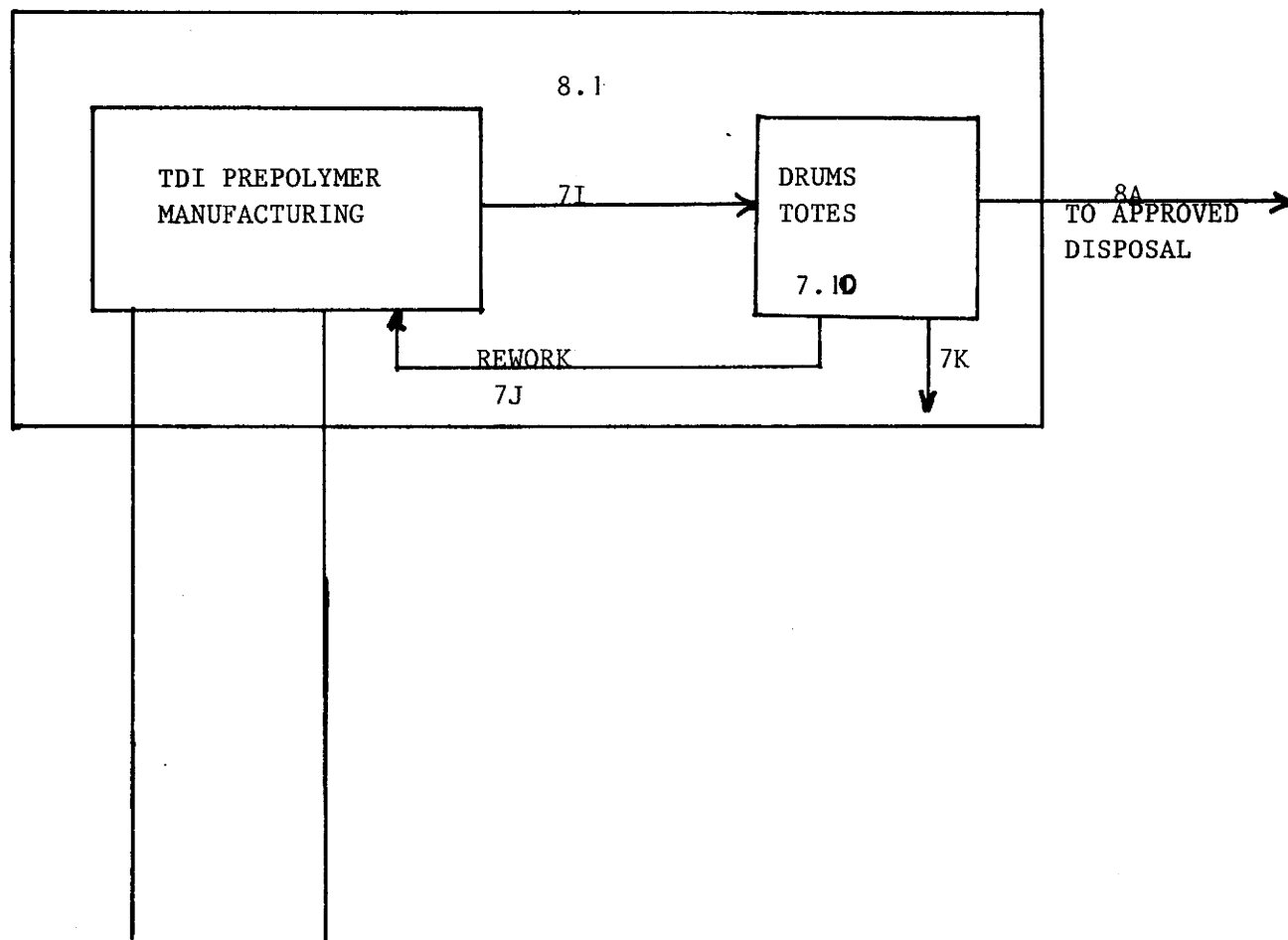
☐ Mark (X) this box if you attach a continuation sheet.

PART A RESIDUAL TREATMENT PROCESS DESCRIPTION

8.01 In accordance with the instructions, provide a residual treatment block flow diagram which describes the treatment process used for residuals identified in question 7.01.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS



TK VENTS TO ATMOS. VENTS FANS TO ATMOS.

☐ Mark (X) this box if you attach a continuation sheet.

## PART B RESIDUAL GENERATION AND CHARACTERIZATION

8.05 Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the instructions for further explanation and an example.)

CBI

☐ Process type ..... TDI PROPOLYMER MANUFACTURING PROCESS

a.	b.	c.	d.	e.	f.	g.
Stream ID Code	Type of Hazardous Waste <sup>1</sup>	Physical State of Residual <sup>2</sup>	Known Compounds <sup>3</sup>	Concentrations (% or ppm) <sup>4,5,6</sup>	Other Expected Compounds	Estimated Concentrations (% or ppm)
8A	T	OL	TDI	10-50 % (E) (W)	NA	NA
		OL	TDI PROPOLYMER	60-100% (E) (W)	NA	NA
7L } 7M } 7N }	T	GU	AIR	99.9+ % (E) (W)	NA	NA
		GU	TDI	25 PPM (E) (W)	NA	NA
70	T	GU	AIR	99.9+% (E) (W)	NA	NA
		GU	TDI	0.05 PPM (E) (W)	NA	NA

8.05 continued below

☐ Mark (X) this box if you attach a continuation sheet.



---

8.05 (continued)

<sup>1</sup>Use the following codes to designate the type of hazardous waste:

I = Ignitable  
C = Corrosive  
R = Reactive  
E = EP toxic  
T = Toxic  
H = Acutely hazardous

<sup>2</sup>Use the following codes to designate the physical state of the residual:

GC = Gas (condensable at ambient temperature and pressure)  
GU = Gas (uncondensable at ambient temperature and pressure)  
SO = Solid  
SY = Sludge or slurry  
AL = Aqueous liquid  
OL = Organic liquid  
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

---

8.05 continued below

---

☐ Mark (X) this box if you attach a continuation sheet.

---

8.05 (continued)

<sup>3</sup>For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column d. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

<u>Additive Package Number</u>	<u>Components of Additive Package</u>	<u>Concentrations (% or ppm)</u>
<u>1</u>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<u>(N/A)</u>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<u>2</u>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<u>3</u>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<u>4</u>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<u>5</u>	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>

<sup>4</sup>Use the following codes to designate how the concentration was determined:

A = Analytical result  
E = Engineering judgement/calculation

8.05 continued below

☐ Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

<sup>5</sup>Use the following codes to designate how the concentration was measured:

V = Volume

W = Weight

<sup>6</sup>Specify the analytical test methods used and their detection limits in the table below. Assign a code to each test method used and list those codes in column e.

<div>N/A</div> <u>Code</u>	<u>Method</u>	<u>Detection Limit</u> <u>(± ug/l)</u>
<u>1</u>		
<u>2</u>		
<u>3</u>		
<u>4</u>		
<u>5</u>		
<u>6</u>		

☐ Mark (X) this box if you attach a continuation sheet.

8.06 Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the instructions for further explanation and an example.)

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

a.	b.	c.	d.	e.		f.	g.
Stream ID Code	Waste Description Code <sup>1</sup>	Management Method Code <sup>2</sup>	Residual Quantities (kg/yr)	Management of Residual (%)		Costs for Off-Site Management (per kg)	Changes in Management Methods
				On-Site	Off-Site		
8A	B69	7S	900	0	100 %	\$1.02	1I (4/89)
		1A	900	100 %	0	NA	NONE
7L } 7M } 7N }	B91	M5A	<7	100 %	0	NA	NONE
7Ø	B91	M5A	<1	100 %	0	NA	NONE

<sup>1</sup>Use the codes provided in Exhibit 8-1 to designate the waste descriptions

<sup>2</sup>Use the codes provided in Exhibit 8-2 to designate the management methods

☐ Mark (X) this box if you attach a continuation sheet.

8.22 Describe the combustion chamber design parameters for each of the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in your process block or residual treatment block flow diagram(s).

☐

Incinerator	Combustion Chamber Temperature (°C)		Location of Temperature Monitor		Residence Time In Combustion Chamber (seconds)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
1						
2						
3						

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes ..... 1  
No ..... 2

B.23 Complete the following table for the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in your process block or residual treatment block flow diagram(s).

☐

Incinerator	Air Pollution Control Device <sup>1</sup>	Types of Emissions Data Available
1	N/A	N/A
2	N/A	N/A
3	N/A	N/A

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes ..... 1  
No ..... 2

<sup>1</sup>Use the following codes to designate the air pollution control device:

S = Scrubber (include type of scrubber in parenthesis)  
E = Electrostatic precipitator  
O = Other (specify) \_\_\_\_\_

☐ Mark (X) this box if you attach a continuation sheet.

Attachments for 1.04b:

1. Notification letter to customers listing trade name products.

89 JUL -5 AM 9:24  
DEPARTMENT OF  
OFFICE



Isofoam® Systems  
A Division of PMC, Inc.

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

April 5, 1989

The Environmental Protection Agency promulgated the "Comprehensive Assessment Information Rule(CAIR)," 40 CFR Part 704 which appeared in the Federal Register(53 FR 51698) on December 22, 1988. This rule has notification, reporting and record-keeping requirements for certain manufacturers, importers and processors of toluene diisocyanate(TDI) and several other substances.

As a customer of IPI, you may have obligations under CAIR when using our TDI-containing trade name products. IPI will be reporting as a processor of 80/20 2,4-/2,6-toluene diisocyanate(CAS 26471-62-5).

The following trade name products made by IPI contain 80/20 TDI(CAS 26471-62-5) and must be reported under CAIR unless certain exemptions apply:

Isofoam® PE-2A	Isofoam® SR-0609A	Castomer <sup>tm</sup> E-0600A
Isofoam® F-0071A	Isofoam® SR-0672A	Castomer <sup>tm</sup> E-0852A
Isofoam® F-0538A	Isofoam® SR-0700A	Castomer <sup>tm</sup> E-0866A
Isofoam® IS-0674A	Isofoam® SR-0832A	Castomer <sup>tm</sup> E-0950A
Isofoam® R-1179A	Isofoam® SR-0894A	Castomer <sup>tm</sup> E-1114A
Isofoam® SR-0486A	Isofoam® SR-0968A	Castomer <sup>tm</sup> E-1154A

The CAIR forms, instructions, regulations and sample question/answer documents are available from:

TSCA Assistance Office (TS-799)  
Office of Toxic Substances  
Environmental Protection Agency  
401 M Street, SW.  
Washington, DC 20460

(800) 658-8823 (202) 554-1404

**IPI**

For processors of the trade name products listed the following questions must be answered as described in the rule at 40 CFR 704.225(page 51722) of the Federal Register:

Questions numbered 1, 2.04 thru 2.09, 2.11 thru 2.16,  
3 all, 4.01 thru 4.05, 5 all, 6.05, 7.01, 7.03 thru  
7.06, 8.01, 8.05, 8.06, 8.23, 9.01 thru 9.15, 9.19,  
9.20, 9.22, 10.01, 10.02, 10.05, 10.08 thru 10.16 and  
10.23.

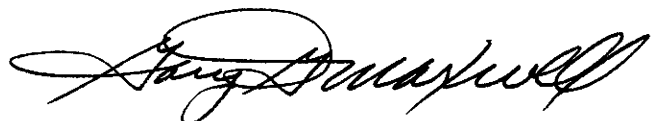
Unless certain exemptions are met, the CAIR reporting form must be submitted by certified mail to:

TSCA Document Processing Center (TS-790)  
Office of Toxic Substances  
U.S. Environmental Protection Agency  
Room L-100  
401 M Street, SW.  
Washington, DC 20460  
ATTENTION: CAIR Reporting

The present deadline for reporting is July 6, 1989. Requests for reasonable extensions described in section 704.215(b) must be in writing and sent to the above address attention of CAIR Reporting Extension.

This notification letter is one of several obligations IPI has under CAIR. Attached is the SPI EPA Alert which summarizes CAIR. We urge you to obtain any necessary documents to determine your obligations. Penalties can be substantial and accrue daily.

Sincerely,  
IPI, A Division of PMC, INC.



Gary G. Maxwell  
Environmental Coordinator  
Technical Support Services

ggm/jrb

Enclosure

CAIR\_IPI



EPA

Compliance  
Assistance  
Program

ALERT

THE SOCIETY OF THE PLASTICS INDUSTRY, INC. 1275 K ST., N. W. WASHINGTON D.C. 20005 (202)371-5200 FAX (202)371-1022

February 3, 1989

## TSCA Compliance

"Comprehensive Assessment Information Rule (CAIR)"

ATTENTION: PROCESSORS OF TDI-CONTAINING MATERIALS

## AFFECTED FACILITIES:

Any company (unless exempted as noted below) that manufactures, imports or processes

- 2,4-Toluene diisocyanate CAS 584-84-9
- 2,6-Toluene diisocyanate CAS 91-08-7
- 80/20 blend of 2,4-Toluene diisocyanate and 2,6-Toluene diisocyanate CAS 26471-62-5

must complete the CAIR reporting form.

Processors with total parent company sales of less than \$4 million are exempt from the reporting requirements. Facilities are also exempt from reporting if the parent company has total sales of less than \$40 million and production/importation at that site is less than 100,000 lbs.

If you, as a non-exempt processor, use any of these isocyanates to make another material or any end product for distribution in commerce, you must complete the form. This applies even if the isocyanate is totally consumed on site or if the final product is an article or a non-hazardous material.

## COMPLIANCE DEADLINES:

The effective date of the rule is February 6, 1989.

**NOTE: The following dates include the 30 day extension on filing and notification granted by the EPA on February 8, 1989.**

Processors must file with EPA using one of the following approaches:

- 1) File report no later than 90 days after your supplier informs you of your reporting requirements. Your supplier must inform you by April 7, 1989, so you must have the form completed and filed by July 6, 1989.
- 2) File report no later than 90 days after the trade name of the product(s) you use appears in the Federal Register. The supplier must supply the EPA with this list by March 20, 1989 and the EPA must publish this list in the Federal Register within the following four weeks.

Although the regulations provide a third option that allows TDI manufacturers to report on behalf of their customers, because there is site specific and economic information required that the manufacturer would not have available, they will probably not be able to provide this service. Therefore, each non-exempt processor should be prepared to file.

## **REGULATORY SUMMARY:**

The basic purpose of the rule is enable EPA to gather in-depth information on chemicals of concern and to establish a general framework for reporting such information.

This first rule covers 19 chemicals, four of which are toluene diisocyanates- 2,4-TDI, 2,6-TDI, the 80/20 blend of 2,4- and 2,6 and a non-specific TDI that is not on the TSCA Inventory.

The rule requires that all non-exempt manufacturers, importers and processors complete a detailed form for each site at which chemicals containing TDI are handled. Articles, impurities, byproducts and non-isolated intermediates are exempted.

## **SUGGESTED COMPLIANCE APPROACH:**

Step 1- Determine whether you use any Toluene diisocyanates (TDI) on site. If you do not use TDI- containing materials, you need not report.

Step 2- If you use TDI-containing materials, determine whether you:  
a) have less than \$4 million in sales or  
b) have sales of less than \$40 million and TDI production/importation of less than 100,000 lbs.  
If either of these situations applies to your facility, you need not report.

## **OTHERWISE YOU MUST COMPLETE AND FILE A REPORT.**

Because of the length and complexity of the form, the Polyurethane Division of SPI has created a Task Force to assist processors in completing the document. This Task Force is preparing a guidance document and is planning to conduct CAIR workshops in the early spring. For further details, contact SPI in DC at 202-371-5223 or the SPI Polyurethane Division at 212-351-5425.

## **STATE AND LOCAL CONCERNS:**

There are no known equivalent state or local programs.

## **REFERENCE DOCUMENTS AVAILABLE FROM EPA:**

- 1) Comprehensive Assessment Information Rule; Final Rule Federal Register Notice December 22, 1988 53 FR 51698
- 2) REPORTING FORM-Comprehensive Assessment Information Rule-EPA Form 7710-52
- 3) GENERAL INSTRUCTIONS-Comprehensive Assessment Information Rule-EPA Form 7710-52

To obtain any of the above documents, contact EPA at:  
TSCA Assistance Office (TS-799)  
ATTN: CAIR Form Request, Office of Toxic Substances  
Environmental Protection Agency, Room E-543  
401 M Street, S.W.  
Washington, DC 20460  
202-554-1404

## **REFERENCE DOCUMENTS AND FORMS AVAILABLE FROM SPI:**

- 1) SPI Question and Answer Document for TDI Processors

SPI also has a limited supply of the EPA documents noted above.

## **CITATIONS:**

Statutory: Section 8(a) of the Toxic Substance Control Act (TSCA)  
Regulatory: December 22, 1988 (53 FR 51698)  
CFR CODE: 40 CFR Part 704

Should you need any assistance in complying with the above or have any additional comments or questions, please contact Richard H. LaLumondier, Assistant Director, Technical & Regulatory Affairs (202) 371-5223.

Attachment for 4.02:

1. MSDS RUBINATE TDI
2. MSDS LUPRANATE T-80 - TYPE 2
3. MSDS FOR EACH PRODUCT BELOW:

Isofoam <sup>®</sup> PE-2A	Isofoam <sup>®</sup> SR-0609A	Castomer <sup>™</sup> E-0600A
Isofoam <sup>®</sup> F-0071A	Isofoam <sup>®</sup> SR-0672A	Castomer <sup>™</sup> E-0852A
Isofoam <sup>®</sup> F-0538A	Isofoam <sup>®</sup> SR-0700A	Castomer <sup>™</sup> E-0866A
Isofoam <sup>®</sup> IS-0674A	Isofoam <sup>®</sup> SR-0832A	Castomer <sup>™</sup> E-0950A
Isofoam <sup>®</sup> R-1179A	Isofoam <sup>®</sup> SR-0894A	Castomer <sup>™</sup> E-1114A
Isofoam <sup>®</sup> SR-0486A	Isofoam <sup>®</sup> SR-0968A	Castomer <sup>™</sup> E-1154A

# MATERIAL SAFETY DATA SHEET

2290

## ICI Polyurethanes Group

West Deptford, New Jersey 08066

Phone, 24 hours: (302) 575-3000

Medical inquiries: (800) 327-8633

07080R

Rev.: F

Date: 02/06/89

### SECTION 1 NAME & HAZARD SUMMARY

Material name: RUBINATE TDI

Hazard summary (as defined by OSHA Hazard Comm. Std., 29 CFR 1910.1200):

Physical hazards: Unstable.

Health hazards: Corrosive (eye), irritant (skin, respiratory passages, skin sensitizer), inhalation (TLV), harmful pulmonary (lung) sensitizer. Based on TDI - harmful (respiratory sensitizer, lung injury).

Read the entire MSDS for a more thorough evaluation of the hazards.

SECTION 2 INGREDIENTS	%	TLV (ACGIH)
Toluene diisocyanate, 2,4-isomer (CAS 584-84-9)	80	0.005 ppm
Toluene diisocyanate, 2,6-isomer (CAS 91-08-7)	20	Not listed

Ingredients not precisely identified are proprietary or nonhazardous. Values are not product specifications.

### SECTION 3 PHYSICAL DATA

Appearance and odor: Clear, colorless liquid with sharp odor

Boiling point: 484°F, 251.1°C

Vapor pressure (mm Hg at 20°C): 0.02

Vapor density (air = 1): 6.0

Solubility in water: Reacts

pH: No data

Specific gravity: 1.22

% Volatile by volume: No data

### SECTION 4 FIRE AND EXPLOSION HAZARD DATA

Flash point: 270°F, 132°C (OC)

Autoignition temperature: No data

Flammable limits (STP): 0.9-9.5%

Extinguishing media:

Dry chemical, foam, carbon dioxide, halogenated agents. If water is used, use very large quantities. The reaction between water and hot isocyanate may be vigorous.

Special fire fighting protective equipment:

Self-contained breathing apparatus with full facepiece and protective clothing.

---

**SECTION 4 FIRE AND EXPLOSION HAZARD DATA (continued)**

---

Unusual fire and explosion hazards:

Water contamination will produce carbon dioxide. Do not reseal contaminated containers as pressure buildup may rupture them.

---

**SECTION 5 REACTIVITY DATA**

---

Stability:

Stable under normal conditions.

---

Incompatibility:

This product will react with any materials containing active hydrogens, such as water, alcohol, ammonia, amines, alkalies and acids. The reaction with water is very slow under 50°C, but is accelerated at higher temperatures and in the presence of alkalies, tertiary amines, and metal compounds. Some reactions can be violent.

---

Hazardous decomposition products:

Combustion products: Carbon dioxide, carbon monoxide. Nitrogen oxides, ammonia. Trace amounts of hydrogen cyanide.

---

Hazardous polymerization:

May occur. High temperatures in the presence of alkalies, tertiary amines, and metal compounds will accelerate polymerization. Possible evolution of carbon dioxide gas may rupture closed containers.

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**SECTION 6 HEALTH HAZARD ASSESSMENT**

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General:

The health hazard assessment is based on an evaluation of the chemical composition together with information from a search of the scientific literature and other commercial sources.

---

Ingestion:

The acute oral LD50 in rat is reported to be 5,800 mg/kg. Relative to other materials, this material is classified as "practically nontoxic" by ingestion. In humans, irritation or chemical burns of the mouth, pharynx, esophagus and stomach can develop following ingestion. Injury may be severe and cause death.

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Eye contact:

This material is reported to induce chemical burns in rabbit eye studies; a similar degree of eye injury may develop after contact with human eyes.

---

Skin contact:

This material is reported to be severely irritating in rabbit dermal irritation studies and will probably irritate human skin. Skin sensitization and irritation may develop after repeated and/or prolonged contact with human skin.

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Skin absorption:

The acute dermal LD50 in rabbit is reported to be above 16 g/kg. Systemically toxic concentrations of this product will probably not be absorbed through human skin.

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**SECTION 6 HEALTH HAZARD ASSESSMENT (continued)**

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**Inhalation:**

Vapors and aerosols can irritate eyes, nose and respiratory passages. TDI vapors are easily generated and are lethal to rats via inhalation at concentrations below 10 ppm. A no effect level for rats of about 0.1 ppm was determined from a subacute study. This and other data indicate the vapors and aerosols of TDI are highly toxic relative to the vapors of other compounds. Vapors and aerosols of TDI strongly irritate the upper and lower respiratory tract. Human experience indicates that TDI will induce an asthma-like respiratory sensitization in some individuals. If applications which involve spraying (e.g. aerosols and mists) or if elevated temperatures are used, even higher vapor concentrations may result and introduce a greater degree of risk of inhalation injury. Rat and mouse toxicity and carcinogenicity studies were conducted with two years of inhalation exposure to vapors of TDI at concentrations of 0.05 and 0.15 ppm. No indication of carcinogenic effect was observed. However, mice exposed to 0.15 ppm for two years showed reduced weight gain and signs of irritation in the upper and lower respiratory tract. No other effect of toxicological significance was observed.

---

**Other effects of overexposure:**

There are two studies which allege that workers exposed to TDI at or near the current TLV have experienced impaired ventilatory capacities. These findings have not been independently substantiated. The National Toxicology Program (NTP) 4th Annual Report on Carcinogens (1985) lists TDI as a substance that may reasonably be anticipated to be a carcinogen based on a NTP Technical Report. In the cited study, laboratory animals gavaged TDI in corn oil developed cancer. In our view, the inhalation study is of more potential biological relevance to man.

---

**First aid procedures:**

Skin: Wash material off of the skin with plenty of soap and water. If redness, itching, or a burning sensation develops, get medical attention. Wash contaminated clothing and decontaminate footwear before reuse.

Eyes: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Have eyes examined and treated by medical personnel.

Ingestion: Do not induce vomiting. Give 1 or 2 glasses of water to drink and refer person to medical personnel. (Never give anything by mouth to an unconscious person.)

Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is labored, give oxygen. Consult medical personnel.

Note to physician: Probable mucosal damage may contraindicate the use of gastric lavage following ingestion.

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**SECTION 7 SPILL OR LEAK PROCEDURES**

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Steps to be taken in case material is released or spilled:

Wear skin, eye, and respiratory protection during cleanup. Soak up material with absorbent and shovel into a chemical waste container. Cover container, but do not seal, and remove from work area. Prepare a decontamination solution of 0.2-5% liquid detergent and 3-8% concentrated ammonium hydroxide in water (5-10% sodium carbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier's material safety data sheets. All operations should be performed by trained personnel familiar with the hazards of the chemicals used. Treat the spill area with the decontamination solution, using about 10 parts of solution for each part of the spill, and allow it to react for at least 10 minutes. Carbon dioxide will be evolved, leaving insoluble polyureas. For major spills, call CHEMTREC (Chemical Transportation Emergency Center) at 800-424-9300.

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Disposal method:

Slowly stir the isocyanate waste into the decontamination solution described above using 10 parts of the solution for each part of the isocyanate. Let stand for 48 hours, allowing the evolved carbon dioxide to vent away. Neutralize the waste. Neither the solid nor the liquid portion is a hazardous waste under RCRA, 40 CFR 261.

---

Container disposal:

Drums must be decontaminated in properly ventilated areas by personnel protected from the inhalation of isocyanate vapors. Spray or pour 5-15 liters of decontaminating solution into the drum, making sure the walls are well rinsed. Leave the drum soaking unsealed for 48 hours. Pour out the decontaminating solution and triple rinse the empty container. Puncture or otherwise destroy the rinsed container before disposal.

---

**SECTION 8 SPECIAL PROTECTION INFORMATION**

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TLV® or suggested control value:

The ACGIH TLV, OSHA PEL, and NIOSH recommendation for TDI is 0.005 ppm 8-hour TWA, 0.02 ppm STEL.

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Ventilation:

If needed, use local exhaust ventilation to keep airborne concentrations below the TLV. Follow guidelines in the ACGIH publication "Industrial Ventilation". Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination.

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Respiratory protection:

Because of the low vapor pressure, ventilation is usually sufficient to keep vapors below the TLV at room temperatures. Exceptions are when the material is sprayed or heated. If airborne concentrations exceed or are expected to exceed the TLV, use MSHA/NIOSH approved positive pressure supplied air respirator with a full facepiece or an air supplied hood. For emergencies, use a positive pressure self-contained breathing apparatus. Air purifying (cartridge type) respirators are not approved for protection against isocyanates.

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**SECTION 8 SPECIAL PROTECTION INFORMATION (continued)**

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**Protective clothing:**

Gloves determined to be impervious under the conditions of use. Depending on conditions of use, additional protection may be required such as apron, arm covers, or full body suit. Wash contaminated clothing before rewearing. The literature indicates that clothing constructed of butyl rubber, Viton, Silver Shield, Saranex coated Tyvek, as well as some nitrile rubber and polyvinyl alcohol (PVA) coated garments have excellent resistance to permeation by TDI. Clothing constructed of Teflon, as well as some garments constructed of nitrile rubber, natural rubber and PVA exhibited limited resistance to permeation by TDI. Some clothing constructed of natural rubber or polyethylene exhibited little resistance to permeation by TDI. Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH.

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**Eye protection:**

Chemical tight goggles and full faceshield.

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**Other protective equipment:**

Eyewash station and safety shower in work area.

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**SECTION 9 SPECIAL PRECAUTIONS OR OTHER COMMENTS**

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**Special precautions or other comments:**

Prevent skin and eye contact. Observe TLV limitations. Avoid breathing vapors or aerosols. Workers should shower and change to fresh clothing after each shift. A sensitized individual should not be exposed to the product which caused the sensitization. Store in tightly sealed containers to protect from atmospheric moisture. Store in a cool area. Individuals with existing respiratory disease such as chronic bronchitis, emphysema or asthma should not be exposed to isocyanates. These individuals should be identified through baseline and annual evaluation and removed from further exposure. Medical examination should include medical history, vital capacity, and forced expiratory volume at one second.

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**SECTION 10 REGULATORY INFORMATION**

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**TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710:**

All ingredients are on the TSCA Section 8(b) Inventory.

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**CERCLA and SARA Regulations (40 CFR 355, 370, and 372):**

Section 313 Supplier Notification. This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372: 100% TDI (CAS 584-84-9 and 91-08-7).

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**State Regulations:**

California Proposition 65: No warnings are necessary.

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The information herein is given in good faith  
but no warranty, expressed or implied, is made.

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# MATERIAL SAFETY DATA SHEET

BASF Corporation Chemicals Division  
100 Cherry Hill Road, Parsippany, New Jersey 07054, (201) 316-3000

# BASF

HMIS: H4 F1 R1

PRODUCT NUMBER: 585622 LUPRANATE\* T80-Type 2

## SECTION I

\*Registered Trademark

TRADE NAME: LUPRANATE\* T80-Type 2

CHEMICAL NAME: Toluene Diisocyanate

SYNONYMS: TDI; Tolylene Diisocyanate

FORMULA:  $\text{CH}_3\text{C}_6\text{H}_4\text{NCO}_2$

CHEMICAL FAMILY: Aromatic Isocyanates

MOL. WGT.: 174.16

## SECTION II - INGREDIENTS

COMPONENT	CAS NO.	%	PEL/TLV - SOURCE
LUPRANATE* T80-Type 2 Contains: 2,4 Toluene Diisocyanate	584-84-9	100 80	Not established 0.005 ppm; 0.02 ppm STEL ACGIH, OSHA (Final) 0.02*ppm C OSHA (Trans)
2,6 Toluene Diisocyanate	91-08-7	20	0.005 ppm NIOSH recommen- dation; 0.02 ppm STEL
SARA Title III Sect. 313: Listed. All components are in TSCA inventory.			

## SECTION III - PHYSICAL DATA

BOILING/MELTING POINT @760 mm Hg: 484°F/ N/A	pH: N/A
VAPOR PRESSURE mm Hg @20 C: 0.01	Vapor Density (Air=1): 6.0
SPECIFIC GRAVITY OR BULK DENSITY: 1.22	Freezing Point: 51.8-53.6°F
SOLUBILITY IN WATER: Water Reacts	
APPEARANCE: Colorless Liquid	ODOR: Pungent
	INTENSITY: Strong

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TEST METHOD): 270°F TAG Open Cup	AUTOIGNITION TEMP: N/A
FLAMMABILITY LIMITS IN AIR (% BY VOL)	LOWER: 0.9% UPPER: 9.5%
EXTINGUISHING MEDIUM	Use water fog, foam or CO2 extinguishing media.
SPECIAL FIREFIGHTING PROCEDURES	Personnel engaged in fighting isocyanate fires must be protected against nitrogen dioxide fumes as well as isocyanate vapors. Firefighters must wear self-contained breathing apparatus and turnout gear.
UNUSUAL FIRE AND EXPLOSION HAZARDS	Avoid water contamination in closed containers or confined areas; carbon dioxide gas is generated.

## EMERGENCY TELEPHONE NUMBER

CHEMTREC 800-424-9300

201-316-3000

THIS NUMBER IS AVAILABLE DAYS, NIGHTS, WEEKENDS, AND HOLIDAYS

PRODUCT NUMBER: 585622

LUPRANATE\* T80-Type 2

**SECTION V - HEALTH DATA****TOXICOLOGICAL TEST DATA:**LUPRANATE\* T80  
2,4 Toluene DiisocyanateRat, Oral LD50  
Mouse, Inhalation LC50**RESULT:**Severe eye and skin  
irritant, sensitizer  
5.8 g/kg.  
10 ppm/4H**EFFECTS OF OVEREXPOSURE:**

The primary routes of exposure to this material are eye or skin contact, and inhalation.

Inhalation of the vapors causes severe irritation to lungs, and pulmonary edema can occur after a serious vapor exposure. Liquid contact causes serious skin and eye burns. Pulmonary sensitization can occur in some individuals leading to asthma-type spasms of the bronchial tubes and difficulty in breathing. Preclude from exposure those individuals having a history of respiratory illness, asthmatic conditions, eye damage or TDI sensitization. Recent studies indicate that overexposure may be associated with chronic lung impairment. In a National Toxicology Program (NTP) study, TDI was carcinogenic when given orally to rats and mice at maximum tolerated doses. TDI was not carcinogenic to rats in a two-year inhalation study. Based on the results of the oral study, TDI was included in the NTP Annual Report on Carcinogens.

**FIRST AID PROCEDURES:**

Existing medical conditions aggravated by exposure to this material:  
Pulmonary disorders.

Eyes-Immediately wash eyes with running water for 15 minutes.

Get immediate medical attention.

Skin-Wash affected areas with water while removing contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse.

Ingestion-If swallowed, DO NOT INDUCE VOMITING. Dilute with water or milk and get immediate medical attention. Never give fluids or induce vomiting if the victim is unconscious or having convulsions.

Inhalation-Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

**SECTION VI - REACTIVITY DATA****STABILITY:** Stable.**CONDITIONS TO AVOID:** Avoid temperatures >40°C for extended periods of time.**CHEMICAL INCOMPATIBILITY:** Basic compounds, caustic soda, tertiaryamines, water**HAZARDOUS DECOMPOSITION PRODUCTS:** TDI vapors, NOx, CO and HCN.**HAZARDOUS POLYMERIZATION:** May occur. Avoid contamination with moisture  
**CONDITIONS TO AVOID:** and other products that react with isocyanates.**CORROSIVE TO METAL:** No**OXIDIZER:** No**SECTION VII - SPECIAL PROTECTION****RESPIRATORY PROTECTION:**

Approved respirator for transferring operations or escape.  
Self-contained breathing apparatus if the P.E.L. is exceeded, or in confined areas or if a leak occurs.

**EYE PROTECTION:** Wear fitted goggles or face shield and safety glasses.**PROTECTIVE CLOTHING:** Rubber gloves, coveralls, boots and rubber apron which must be cleaned after each use.**VENTILATION:** Use local exhaust wherever vapors are generated.**OTHER:** Maintain work area below P.E.L.

PRODUCT NUMBER: 585622 LUPRANATE\* T80-Type 2

## SECTION VIII - ENVIRONMENTAL DATA

### ENVIRONMENTAL TOXICITY DATA:

Aquatic toxicity rating: TLM 96: 10 ppm-1 ppm.

### SPILL AND LEAK PROCEDURES:

LUPRANATE\* T80 is a RCRA-regulated product. Wear protective clothing, evacuate all not involved in the cleanup. For minor spills, absorb with absorbent and containerize into open top drums. Decontaminate spill area with a mixture of 90% water, 8% concentrated ammonia and 2% detergent. Dispose of

HAZARDOUS SUBSTANCE SUPERFUND: Yes RQ (lbs): 100

### WASTE DISPOSAL METHOD:

waste in a RCRA-permitted facility.  
Incinerate or landfill in a RCRA-permitted facility.

HAZARDOUS WASTE 40CFR261: Yes

HAZARDOUS WASTE NUMBER: U 223

### CONTAINER DISPOSAL:

Containers should be neutralized with liquid decontaminant. Empty containers, containing less than 1" of residue, may be landfilled. If containers are not empty, they must be disposed as a hazardous waste in a RCRA-licensed facility.

## SECTION IX - SHIPPING DATA

D.O.T. PROPER SHIPPING NAME (49CFR172.101-102)

Toluene Diisocyanate

HAZARDOUS SUBSTANCE  
(49CFR CERCLA LIST)

Yes--TDI

REPORTABLE QUANTITY (RQ) 100 lb

D.O.T. HAZARD CLASSIFICATION (CFR172.101-102)

PRIMARY

Poison B

SECONDARY

D.O.T. LABELS REQUIRED (49CFR172.101-102)

Poison

D.O.T. PLACARDS  
REQUIRED (CFR172.504)

BULK ONLY  
Poison2078

POISON CONSTITUENT  
(49CFR172.203(K))  
TDI

### BILL OF LADING DESCRIPTION

Toluene Diisocyanate-Poison B-UN 2078 RQ 100 lbs.  
\*\*\* Placarded: POISON \*\*\*

CC NO. 190

UN/NA CODE2078

DATE PREPARED: 4 / 17 / 86

UPDATED: 5 / 25 / 89

WHILE BASF CORPORATION BELIEVES THE DATA SET FORTH HEREIN ARE ACCURATE AS OF THE DATE HEREOF, BASF CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO AND EXPRESSLY DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. SUCH DATA ARE OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION.

**SECTION X - PRODUCT LABEL****LUPRANATE\* T80****DANGER: POISON****HARMFUL IF INHALED.**

CONTACT WITH EYES AND SKIN RESULTS IN SERIOUS BURNS. INHALATION OF VAPORS CAUSES SEVERE IRRITATION TO LUNGS. PULMONARY EDEMA MAY OCCUR. PULMONARY SENSITIZATION CAN OCCUR IN SOME INDIVIDUALS, LEADING TO ASTHMA-TYPE SPASMS OF THE BRONCHIAL TUBES AND DIFFICULTY IN BREATHING. INDIVIDUALS WITH A HISTORY OF RESPIRATORY ILLNESS, ASTHMATIC CONDITIONS, EYE DAMAGE OR TDI SENSITIZATION SHOULD NOT BE EXPOSED TO THIS PRODUCT.

IN AN NTP STUDY, TDI WAS CARCINOGENIC TO RODENTS GIVEN HIGH ORAL DOSES AND IS INCLUDED IN THE NTP ANNUAL REPORT ON CARCINOGENS. TDI WAS NOT CARCINOGENIC TO RATS IN A TWO-YEAR INHALATION STUDY.

Use with local exhaust. Wear an approved respirator or self-contained breathing apparatus, fitted goggles or face shield and safety glasses, rubber gloves, coveralls, boots, apron and other protective clothing as necessary to prevent contact.

**FIRST AID:**

Eyes-Immediately wash eyes with running water for 15 minutes.

Get immediate medical attention.

Skin-Wash affected areas with water while removing contaminated clothing. Get immediate medical attention. Launder contaminated clothing before reuse.

Ingestion-If swallowed, DO NOT INDUCE VOMITING. Dilute with water or milk and get immediate medical attention. Never give fluids or induce vomiting if the victim is unconscious or having convulsions.

Inhalation-Move to fresh air. Aid in breathing, if necessary, and get immediate medical attention.

**HANDLING AND STORAGE:** Keep containers closed and store in a well-ventilated place. Outage of container should be filled with dry inert gas at atmospheric pressure to avoid reaction with moisture. Contamination by moisture or basic compounds can cause dangerous pressure buildup in closed container. Store above 60 F to prevent freezing and isomer separation. If solidified, do not exceed 95 F while thawing to prevent discoloration. Mix before using.

**IN CASE OF SPILLS OR LEAKS:** Material is a RCRA-regulated product. Spills should be contained, absorbed and placed in suitable containers for disposal in a RCRA-licensed facility.

**IN CASE OF FIRE:** Use water fog, foam or CO2 extinguishing media. Firefighters should be equipped with self-contained breathing apparatus and turnout gear for protection against TDI vapors and toxic decomposition products.

**EMPTY CONTAINERS:** All labeled precautions must be observed when handling, storing and transporting empty containers due to product residues. Do not reuse this container unless it is professionally cleaned and reconditioned.

**DISPOSAL:** Spilled material, unused contents and empty containers must be disposed of in accordance with local, state and federal regulations. Refer to our Material Safety Data Sheet for specific disposal instructions.

**IN CASE OF CHEMICAL EMERGENCY:** Call CHEMTREC day or night for assistance and information concerning spilled material, fire, exposure and other chemical accidents 800-424-9300.

**ATTENTION:** This product is sold solely for use by industrial institutions. Refer to our Technical Bulletin and Material Safety Data Sheet regarding safety, usage, applications, hazards, procedures and disposal of this product. Consult your supervisor for additional information.

**FOR INDUSTRY USE ONLY.**

CAS No.: 584-84-9; 91-08-7.

Proper Shipping Name: Toluene Diisocyanate, Poison B - UN 2078 RQ

Made in USA.

Polymers

0488



## MATERIAL SAFETY DATA SHEET

PRODUCT E-0950A

HAZARD RATING N F P A	4 - EXTREME	
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

## SECTION I

1	I.P. INC.	EMERGENCY TELEPHONE MANUFACTURER (301) 392-4800 CHEM TREC 1-(800) 424-9300
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)		
2	505 Blue Ball Road, Elkton, MD 21921	
CHEMICAL NAME OR FAMILY		FORMULA
3	Reactive Isocyanates	4 Proprietary

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

CHEMICAL	PHYSICAL
HAZARDOUS DECOMPOSITION PRODUCTS Oxides of carbon and nitrogen	FORM 8 Liquid
5	ODOR 9 Sharp Pungent TDI Odor
INCOMPATIBILITY (KEEP AWAY FROM) Water (moisture), Alcohols, Amines, Strong Acids and Bases	APPEARANCE 10 Liquid
6	COLOR 11 Clear
LIST ALL TOXIC AND HAZARDOUS INGREDIENTS Toluene Diisocyanate (TDI)/Polyether Prepolymer Free Isocyanate	SPECIFIC GRAVITY 12 (WATER = 1) 1.04 @ 25°C
7	BOILING PT. 13 185 °C 365 °F

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.	FLASH POINT (METHOD USED) C.O.C. 26 152 °C 305 °F
24	FLAMMABLE LIMITS % 27 LOWER NDA UPPER NDA
UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture contamination in closed containers. Reaction with moisture will generate CO <sub>2</sub> which may rupture the container.	EXTINGUISHING AGENTS X DRY CHEMICAL X CO <sub>2</sub> X WATER SPRAY X FOAM X WATERFOG X SAND/EARTH 28 OTHER
25	

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR) 29 0.02 ppm - O.S.H.A. TLV for TDI	
EFFECTS OF OVEREXPOSURE Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.	
30	
TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.	
31	
EMERGENCY FIRST AID PROCEDURES In case of eye contact, flush with plenty of water for 32 EYES at least 15 minutes. Call a physician.	
33 SKIN CONTACT Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.	
34 INHALATION Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.	
35 IF SWALLOWED Call a physician immediately.	

17 (Water = 1)	NDA
VAPOR PRESSURE 18 (mm Hg at 20 °C)	40.011
VAPOR DENSITY 19 (AIR = 1)	NDA
pH AS IS 20 pH (XXX)	NDA
STRONG ACID	<input type="checkbox"/>
STRONG BASE	<input type="checkbox"/>
STABLE	XX
UNSTABLE	<input type="checkbox"/>
21	
VISCOSITY SUS 22 AT 100 °F	NDA
23	
Viscosity @ 25°C	
700 cps	

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt;= LESS THAN

&gt;= MORE THAN

## MATERIAL SAFETY DATA SHEET

PRODUCT E-0950A

## SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm	PROTECTIVE GLOVES Impervious rubber or plastic
RESPIRATORY PROTECTION (SPECIFY TYPE) Use NIOSH approved breathing apparatus.	EYE PROTECTION Safety goggles and face shield to avoid splashing on face.
	OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air & splash apron.

## SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

## WASTE DISPOSAL

Dispose of consistent with Federal, State, and local regulations.

## SECTION VII - SPECIAL PRECAUTIONS

## PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C).

## SECTION VIII - TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME NA	
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS NA	U.D. NUMBER NA
TRANSPORTATION EMERGENCY INFORMATION  CHEM TREC T-(800) 424-9300	RD 50	LABEL(S) REQUIRED 51 NA
	FREIGHT CLASSIFICATION 52 Liquid Plastic Material/NOIBN	
	SPECIAL TRANSPORTATION NOTES 53 None	

## SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

SIGNATURE

REVISION DATE

SENT TO ATTN:

DATE

SUPERSEDES

TITLE Sales Service Supervisor

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

PRODUCT E-1114A

HAZARD RATING  
N 4 - EXTREME  
F 3 - HIGH  
P 2 - MODERATE  
A 1 - SLIGHT  
0 - INSIGNIFICANTFire  
Reactivity  
Toxicity  
Special

## SECTION I

I.P. INC.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

505 Blue Ball Road, Elkton, MD 21921

CHEMICAL NAME OR FAMILY

Reactive Isocyanates

FORMULA

Proprietary

EMERGENCY TELEPHONE  
MANUFACTURER

(301) 392-4800

CHEM TREC 1-(800) 424-9300

## SECTION II CHEMICAL AND PHYSICAL PROPERTIES

## CHEMICAL

## PHYSICAL

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of carbon and nitrogen

INCOMPATIBILITY (KEEP AWAY FROM)

Water (moisture), Alcohols, Amines, Strong Acids and Bases

LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

Toluene Diisocyanate (TDI)/Polyether Prepolymer  
Free Isocyanate

FORM

Liquid

ODOR Sharp Pungent  
TDI Odor

APPEARANCE

Liquid

COLOR

Clear Yellow

SPECIFIC GRAVITY

1.06 @ 25°C

BOILING PT.

> 177 °C  
> 350 °F

MELTING PT.

NDA °C  
NDA °FSOLUBILITY  
IN WATER

Reacts

AT NA °C

% VOLATILE

(BY WT %) NDA

EVAP. RATE

NDA

VAPOR PRESSURE

0.011

VAPOR DENSITY

NDA

pH AS IS

NDA

pH (XXX)

NDA

STRONG ACID

STRONG BASE

STABLE

UNSTABLE

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

NDA

## SECTION III FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

FLASH POINT (METHOD USED)

C.O.C.

152 °C 305 °F

FLAMMABLE LIMITS %

LOWER NDA UPPER NDA

UNUSUAL FIRE AND EXPLOSION HAZARDS

Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.

EXTINGUISHING AGENTS

X DRYCHEMICAL X CO<sub>2</sub>

X WATERSPRAY X FOAM

X WATERFOG X SAND/EARTH

X OTHER

## SECTION IV HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR)

0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE Irritant to eyes &amp; respiratory tract. May cause headaches, nausea, coughing, shortness of breath, &amp; chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

EMERGENCY FIRST AID PROCEDURES

In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.

SKIN CONTACT Wash thoroughly with soap and water. Remove contaminated clothing &amp; discard contaminated shoes. Wash clothing before reuse.

INHALATION Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

IF SWALLOWED Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt; = LESS THAN

&gt; = MORE THAN

## MATERIAL SAFETY DATA SHEET

PRODUCT E-1114A

### SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm		PROTECTIVE GLOVES Impervious rubber or plastic
RESPIRATORY PROTECTION (SPECIFY TYPE) Use NIOSH approved breathing apparatus.	EYE PROTECTION Safety goggles and face shield to avoid splashing on face.	OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air & splash apron.

### SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO <sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.
WASTE DISPOSAL Dispose of consistent with Federal, State, and local regulations.

### SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid contact with moisture. Isocyanates react with water and generate CO <sub>2</sub> which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C).
--

### SECTION VIII - TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME NA	
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS NA	I.D. NUMBER NA
TRANSPORTATION EMERGENCY INFORMATION  CHEM TREC 1-(800) 424-9300	RQ NA	LABEL(S) REQUIRED NA
	FREIGHT CLASSIFICATION Liquid Plastic Material/NOIBN	
	SPECIAL TRANSPORTATION NOTES None	

### SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.
---

SIGNATURE <u>C. J. Sore</u>	TITLE <u>Sales Service Supervisor</u>
REVISION DATE <u>1/17/86</u>	SENT TO ATTN: _____ DATE _____
SUPERSEDES _____	

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.





# MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> E-1154A

HAZARD RATING N F P A	4 - EXTREME	
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

## SECTION I

1 ITCO MANUFACTURING DIVISION OR SUBSIDIARY <b>1</b> I. P. Inc.		EMERGENCY TELEPHONE MANUFACTURER (301) 392-4800 CHEM TREC 1-(800) 424-9300
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) <b>2</b> 505 Blue Ball Road, Elkton, Maryland 21921		
CHEMICAL NAME OR FAMILY <b>3</b> Toluene Diisocyanate (TDI) Prepolymer	FORMULA <b>4</b> Proprietary	

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

### CHEMICAL

### PHYSICAL

HAZARDOUS DECOMPOSITION PRODUCTS <b>5</b> Oxides of Carbon and Nitrogen	FORM <b>8</b> liquid
INCOMPATIBILITY (KEEP AWAY FROM) <b>6</b> Water (moisture), Alcohols, Amines, Strong Acids and Bases	ODOR <b>9</b> Sharp Pungent TDI Odor
LIST ALL TOXIC AND HAZARDOUS INGREDIENTS Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI) Prepolymers	APPEARANCE <b>10</b> Liquid
	COLOR <b>11</b>
	SPECIFIC GRAVITY <b>12</b> (WATER = 1) NDA @ 25°C
	BOILING PT. <b>13</b> NDA °C NDA °F
	MELTING PT. <b>14</b> NDA °C NDA °F
	SOLUBILITY IN WATER AT NA °C <b>15</b> Reacts
	% VOLATILE (BY WT %) <b>16</b> NDA
	EVAP. RATE <b>17</b> (Water = 1) NDA
	VAPOR PRESSURE (mm Hg at 20°C) <b>18</b> < 0.011
	VAPOR DENSITY (AIR = 1) <b>19</b> NDA
	pH AS IS <b>20</b> pH (X X X) NDA
	STRONG ACID <input type="checkbox"/> STRONG BASE <input type="checkbox"/> STABLE <input checked="" type="checkbox"/> UNSTABLE <input type="checkbox"/>
	VISCOSITY SUS AT 100°F <b>22</b> NDA
	Viscosity @ 25°C <b>23</b> < 530 cps

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.	FLASH POINT (METHOD USED) C.O.C. <b>26</b> NDA °C °F
	FLAMMABLE LIMITS % <b>27</b> LOWER NDA UPPER NDA
UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture contamination in closed containers. Reaction with moisture will generate CO <sub>2</sub> which may rupture the container.	EXTINGUISHING AGENTS <input checked="" type="checkbox"/> DRY CHEMICAL <input checked="" type="checkbox"/> CO. <input checked="" type="checkbox"/> WATERSPRAY <input checked="" type="checkbox"/> FOAM <input type="checkbox"/> WATERFOG <input type="checkbox"/> SAND/EARTH <b>28</b> <input type="checkbox"/> OTHER

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR) <b>29</b> 0.02 ppm - O.S.H.A. TLV for TDI
EFFECTS OF OVEREXPOSURE Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.
TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.
EMERGENCY FIRST AID PROCEDURES <b>32</b> EYES In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.
<b>33</b> SKIN CONTACT Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.
<b>34</b> INHALATION Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.
<b>35</b> IF SWALLOWED Call a physician immediately

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

< = LESS THAN

> = MORE THAN



## MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> E-1154A

## SECTION V — SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

36

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

37

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid

splashing on face.

OTHER PROTECTIVE EQUIPMENT

Respirator that provides fresh air &amp; splash apron.

40

## SECTION VI — HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia and detergent.<sup>2</sup> Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

41

WASTE DISPOSAL

Dispose of consistent with Federal, State and local regulations.

42

## SECTION VII — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80° F (5 and 27° C).

43

## SECTION VIII — TRANSPORTATION DATA

44	UNREGULATED BY D.O.T.	<input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
	47			NA
45	REGULATED BY D.O.T.	<input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	
	48			NA
46	TRANSPORTATION EMERGENCY INFORMATION	49	I.D. NUMBER	
		NA		
		50	LABEL(S) REQUIRED	
		51	NA	
46	CHEM TRFC	FREIGHT CLASSIFICATION		
		52	Liquid Plastic Material/NOIBN	
		SPECIAL TRANSPORTATION NOTES		
46		53	None	

## SECTION IX — COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

54

SIGNATURE	<u>C. Moore/me</u>	TITLE	<u>Sales Service Supervisor</u>
REVISION DATE	<u>7/7/87</u>	SENT TO	ATTN:
SUPERSEDES			

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

# MATERIAL SAFETY DATA SHEET

PRODUCT PE-2A

HAZARD RATING N F P A	4 - EXTREME	Fire 2 Reactivity 2 Special 3
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

# IPI

**Isofoam® Systems**

Triumph Industrial Park, 505 Blue Ball Road

P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE  
MANUFACTURER  
(301) 392-4800  
CHEM TRAC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY  
3 Reactive Isocyanates

4 Proprietary

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

### CHEMICAL

### PHYSICAL

#### HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of carbon and nitrogen

#### INCOMPATIBILITY (KEEP AWAY FROM)

Water (moisture), Alcohols, Amines, Strong Acids and Bases

#### LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

Toluene Diisocyanate (TDI)/Polyether Prepolymer  
ZnCO = 128.5

#### FORM

8 Liquid

#### ODOR

9 Sharp Pungent  
TDI Odor

#### APPEARANCE

10 Liquid

#### COLOR

11 Slight Yellow

#### SPECIFIC GRAVITY

12 (WATER = 1) 1.23 @ 25°C

#### BOILING PT.

13 203 °C

398 °F

#### MELTING PT.

14 NDA °C

NDA °F

#### SOLUBILITY IN WATER AT NA °C

15 Reacts

#### % VOLATILE (BY WT %)

16 NDA

#### EVAP. RATE

17 Water = 1 NDA

#### VAPOR PRESSURE

18 (mm Hg at 20 °C) 0.011

#### VAPOR DENSITY (AIR = 1)

19 NDA

#### pH AS IS pH (XXX)

20 NDA

NDA

STRONG ACID ☐

STRONG BASE ☐

STABLE ☒ XX

UNSTABLE ☐

#### VISCOSITY SUS AT 100 °F

22 NDA

#### Viscosity @ 25°C

4000 cps

## SECTION III - FIRE AND EXPLOSION DATA

#### SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

#### FLASH POINT (METHOD USED)

C.O.C.

26 >150 °C >300 °F

#### FLAMMABLE LIMITS %

27 LOWER NDA UPPER NDA

#### UNUSUAL FIRE AND EXPLOSION HAZARDS

Avoid moisture tamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.

#### EXTINGUISHING AGENTS

☒ DRY CHEMICAL ☒ CO<sub>2</sub>

☒ WATER SPRAY ☒ FOAM

☐ WATER FOG ☐ SAND/EARTH

28 ☐ OTHER

## SECTION IV - HEALTH HAZARD DATA

#### PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

#### EMERGENCY FIRST AID PROCEDURES

In case of eye contact, flush with plenty of water for  
32 EYES at least 15 minutes. Call a physician.

#### SKIN CONTACT

Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.

#### INHALATION

Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

#### IF SWALLOWED

Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

< = LESS THAN

> = MORE THAN

# IP

## MATERIAL SAFETY DATA SHEET

PRODUCT PE-2A

### SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid splashing on face.

OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air & splash apron.

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

### SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

WASTE DISPOSAL

Dispose of consistent with Federal, State, and local regulations.

### SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C).

### SECTION VIII - TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME		
	NA		
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS		I.D. NUMBER
	NA		NA
TRANSPORTATION EMERGENCY INFORMATION	RO	LABEL(S) REQUIRED	
	50	51 NA	
	FREIGHT CLASSIFICATION		
	52 Liquid Plastic Material/NOIBN		
CHEM TREC 1-(800) 424-9300	SPECIAL TRANSPORTATION NOTES		
	53 None		

### SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

SIGNATURE C. J. Ware TITLE Sales Service Supervisor  
 REVISION DATE 4/1/86 SENT TO ATTN: \_\_\_\_\_ DATE \_\_\_\_\_  
 SUPERSEDES \_\_\_\_\_

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.



# MATERIAL SAFETY DATA SHEET

PRODUCT F-0071A

HAZARD RATING N F P A	4 - EXTREME	
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	



**Isofoam® Systems**

Triumph Industrial Park, 505 Blue Ball Road  
P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE  
MANUFACTURER  
**301 392-4800**  
CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY  
3 **Reactive Isocyanates**

FORMULA  
4 **Proprietary**

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

CHEMICAL	PHYSICAL
HAZARDOUS DECOMPOSITION PRODUCTS Oxides of carbon and nitrogen	FORM 8 <b>Liquid</b>
INCOMPATIBILITY (KEEP AWAY FROM) Water (moisture), Alcohols, Amines, Strong Acids and Bases	ODOR 9 <b>TDI Odor</b>
LIST ALL TOXIC AND HAZARDOUS INGREDIENTS Toluene Diisocyanate (TDI)/Methylenediphenyl Diisocyanate (MDI) and Polyether Prepolymer with 29% Free Isocyanate.	APPEARANCE 10 <b>Liquid</b>
	COLOR 11 <b>Dark Brown</b>
	SPECIFIC GRAVITY 12 (WATER = 1) <b>1.15 @ 25°C</b>
	BOILING PT. 13 <b>128 °C</b> <b>263 °F</b>
	MELTING PT. 14 <b>NDA</b> °C <b>NDA</b> °F
	SOLUBILITY IN WATER AT _____ °C 15 <b>Reacts</b>
	% VOLATILE (BY WT %) <b>Nil</b>
	EVAP. RATE 17 (_____ = 1) <b>NDA</b>
	VAPOR PRESSURE 18 (mm Hg at 20 °C) <b>NDA</b>
	VAPOR DENSITY (AIR = 1) <b>NDA</b>
	pH AS IS 20 <b>NDA</b>

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.	FLASH POINT (METHOD USED) C.O.C. 26 <b>148 °C</b> <b>298 °F</b>
24	FLAMMABLE LIMITS % NDA
25	27 LOWER _____ UPPER _____
INDIVIDUAL FIRE AND EXPLOSION HAZARDS Avoid moisture contamination in closed containers. Reaction with moisture will generate CO <sub>2</sub> which may rupture the container.	EXTINGUISHING AGENTS X DRYCHEMICAL X CO <sub>2</sub> X WATERSPRAY X FOAM X WATERFOG X SAND/EARTH 28 <input type="checkbox"/> OTHER _____

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR) 29 <b>0.02 ppm - O.S.H.A. TLV for TDI</b>
EFFECTS OF OVEREXPOSURE 30 Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.
TOXICOLOGICAL PROPERTIES 31 May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.
EMERGENCY FIRST AID PROCEDURES 32 In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.
33 SKIN CONTACT Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.
34 INHALATION Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.
35 IF SWALLOWED Call a physician immediately.

21	STRONG ACID <input type="checkbox"/>
	STRONG BASE <input type="checkbox"/>
	STABLE <input checked="" type="checkbox"/>
	UNSTABLE <input type="checkbox"/>
22	VISCOSITY SUS <b>&lt;100</b> <input type="checkbox"/> AT 100 °F <b>100 OR &gt;</b> <input type="checkbox"/>
23	Viscosity @ 25°C <b>120 cps</b>

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

< = LESS THAN

> = MORE THAN



## MATERIAL SAFETY DATA SHEET

PRODUCT F-0071A

## SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid splashing on face.

OTHER PROTECTIVE EQUIPMENT

Work clothing which provides protection from splashed material.

## SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5 % ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

WASTE DISPOSAL

Dispose of consistent with Federal, State, and local regulations.

## SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 60 and 85°F (15 and 30°C).

## SECTION VIII - TRANSPORTATION DATA

44	UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
47		NA	
45	REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	I.D. NUMBER
48		NA	49 NA
46	TRANSPORTATION EMERGENCY INFORMATION	50 RQ	51 LABEL(S) REQUIRED
			NA
		FREIGHT CLASSIFICATION	
		52 Liquid Plastic Material/NOIBN	
49	CHEM TREC 1-(800) 424-9300	SPECIAL TRANSPORTATION NOTES	
		53 None	

## SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

SIGNATURE

TITLE Sales/Service/Supervisor

REVISION DATE 6/24/85

SENT TO ATTN:

DATE 6/24/85

SUPERSEDES 5/9/84

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

# MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> F-0538A

HAZARD RATING		
N	4 - EXTREME	
F	3 - HIGH	
P	2 - MODERATE	
A	1 - SLIGHT	
	0 - INSIGNIFICANT	



Isofoam<sup>®</sup> Systems

Triumph Industrial Park, 505 Blue Ball Road  
P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE  
MANUFACTURER  
**301 392-4800**  
CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY  
3 Reactive Isocyanates

FORMULA  
4 Proprietary

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of carbon and nitrogen

INCOMPATIBILITY (KEEP AWAY FROM)

Water (moisture), Alcohols, Amines, Strong Acids and Bases

LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

Toluene Diisocyanate (TDI)/Methylenediphenyl Diisocyanate (MDI) and Polyether Prepolymer with 29% Free Isocyanate.

CHEMICAL

PHYSICAL

FORM

8 Liquid

ODOR

9 TDI Odor

APPEARANCE

10 Liquid

COLOR

11 Dark Brown

SPECIFIC GRAVITY

12 (WATER = 1) 1.15 @ 25°C

BOILING PT.

128 °C

263 °F

MELTING PT.

NDA °C

NDA °F

SOLUBILITY  
IN WATER

Reacts

AT °C

% VOLATILE  
(BY WT %)

Nil

EVAP. RATE

NDA

VAPOR PRESSURE

18 (mm Hg at 20 °C)

NDA

VAPOR DENSITY  
(AIR = 1)

NDA

pH AS IS

NDA

pH ( )

NDA

STRONG ACID ☐

STRONG BASE ☐

STABLE ☒

UNSTABLE ☐

VISCOSITY

SUS

< 100

AT 100 °F

100 OR >

Viscosity @ 25°C 120 cps

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

FLASH POINT (METHOD USED)

C.O.C.

26 148 °C 298 °F

FLAMMABLE LIMITS %

NDA

27 LOWER UPPER

EXTINGUISHING AGENTS

☒ DRYCHEMICAL ☒ CO<sub>2</sub>

☒ WATERSPRAY ☒ FOAM

☐ WATERFOG ☐ SAND/EARTH

28 ☐ OTHER

UNUSUAL FIRE AND EXPLOSION HAZARDS

Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE

Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES

May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

EMERGENCY FIRST AID PROCEDURES

In case of eye contact, flush with plenty of water for eyes at least 15 minutes. Call a physician.

Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.

Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

< = LESS THAN

> = MORE THAN



## SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

36

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

37

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid splashing on face.

OTHER PROTECTIVE EQUIPMENT

Work clothing which provides protection from splashed material.

## SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

41

WASTE DISPOSAL

Dispose of consistent with Federal, State, and local regulations.

42

## SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 60 and 85°F (15 and 30°C).

43

## SECTION VIII - TRANSPORTATION DATA

44	UNREGULATED BY D.O.T.	<input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME		47	NA
	REGULATED BY D.O.T.	<input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS		48	NA
45	TRANSPORTATION EMERGENCY INFORMATION		RQ	LABEL(S) REQUIRED	50	51 NA
46	CHEM TREC		FREIGHT CLASSIFICATION			
	1-(800) 424-9300		52 Liquid Plastic Material/NOIBN			
			SPECIAL TRANSPORTATION NOTES			
			53	None		

## SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

54

SIGNATURE

*[Signature]*

TITLE Sales/Service/Supervisor

REVISION DATE 6/24/85

SENT TO ATTN:

DATE 6/24/85

SUPERSEDES 5/ 9/84

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.



PRODUCT **ISOFOAM<sup>R</sup>** R-1179A

4 - EXTREME	
3 - HIGH	
2 - MODERATE	
1 - SLIGHT	
0 - INSIGNIFICANT	

**SECTION I**

MANUFACTURING DIVISION OR SUBSIDIARY

1 **IPI**

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

2 **505 Blue Ball Road, Elkton, Maryland 21921**

CHEMICAL NAME OR FAMILY

3 **Polymeric Methylene Diphenyl Isocyanate (MDI)**

FORMULA

**$\text{CH}_2(\text{C}_6\text{H}_4\text{NCO})_2$  + Higher Molecular weight oligomers**

EMERGENCY TELEPHONE

MANUFACTURER

**(301) 392-4800**

CHEM TREC 1-(800) 424-9300

**SECTION II - CHEMICAL AND PHYSICAL PROPERTIES**

CHEMICAL

PHYSICAL

HAZARDOUS DECOMPOSITION PRODUCTS

5 **Oxides of Carbon and Nitrogen**

INCOMPATIBILITY (KEEP AWAY FROM)

6 **Water (Moisture), Alcohols, Amines, Strong Acids and Bases.**

LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

**Polymeric Methylene Diphenyl Isocyanate (MDI)**

7 **Diocetyl Phthalate**

FORM

8 **Liquid**

ODOR

9 **Aromatic Odor**

APPEARANCE

10 **Viscous Liquid**

COLOR

11 **Dark Brown**

SPECIFIC GRAVITY

12 (WATER = 1) **1.16 @ 25°C**

BOILING PT.

13 **> 207 °C**  
**> 406 °F**

MELTING PT.

14 **NDA °C**  
**NDA °F**

SOLUBILITY IN WATER

15 **AT NA °C** **Reacts**

% VOLATILE (BY WT %)

16 **NIL**

EVAP. RATE

17 (Water = 1) **NIL**

18 VAPOR PRESSURE (mm Hg at 20°C) **< 0.000005**

VAPOR DENSITY (AIR = 1)

19 **> 1**

pH AS IS

20 **NDA**

pH X X X

**NDA**

STRONG ACID ☐

STRONG BASE ☐

STABLE ☒

UNSTABLE ☐

21

VISCOSITY

SUS

AT 100°F

22 **NDA**

23 **Viscosity @ 25°C**

**NDA cps**

**SECTION III - FIRE AND EXPLOSION DATA**

SPECIAL FIRE FIGHTING PROCEDURES

Firefighter must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

24 UNUSUAL FIRE AND EXPLOSION HAZARDS: Avoid moisture contamination in closed containers. Reaction with moisture will generate  $\text{CO}_2$  which may rupture the container.

FLASH POINT (METHOD USED)

**C.O.C.**

26 **NDA °C** **°F**

FLAMMABLE LIMITS %

27 **LOWER NDA UPPER NDA**

EXTINGUISHING AGENTS

☒ DRYCHEMICAL ☒  $\text{CO}_2$

☒ WATERSPRAY ☒ FOAM

☐ WATERFOG ☐ SAND/EARTH

28 ☐ OTHER

**SECTION IV - HEALTH HAZARD DATA**

PERMISSIBLE CONCENTRATIONS (AIR)

29 **0.02 ppm - O.S.H.A. TLV for MDI.**

EFFECTS OF OVEREXPOSURE: Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, chest pains. May result in respiratory distress.

30 TOXICOLOGICAL PROPERTIES: May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

EMERGENCY FIRST AID PROCEDURES

32 EYES: Flush with plenty of water for at least 15 minutes. Call a physician.

33 SKIN CONTACT

Wash thoroughly with soap & water. Remove contaminated clothing and discard contaminated shoes.

34 INHALATION

Wash clothing before reuse.

35 IF SWALLOWED

Remove from contaminated area to a fresh air environment. Call a physician. If victim is not breathing, give artificial respiration-preferably mouth to mouth. If breathing is difficult, give oxygen.

Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

< = LESS THAN

> = MORE THAN

# IPM

## MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> R-1179A

### SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical to maintain vapors below the MDI  
TLV = 0.02ppm

36

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use only NIOSH approved apparatus.

37

PROTECTIVE GLOVES

Impervious rubber or

38 plastic

EYE PROTECTION:

Safety goggles and  
face shield to avoid splash-

39 ing on face.

OTHER PROTECTIVE EQUIPMENT

40 None

### SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia & detergent. Wear respirator and other protective equipment for protection of eyes and skin during clean up.

41

WASTE DISPOSAL

Dispose of consistent with Federal, State and local regulations.

42

### SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80 F (15 and 27 C).

43

### SECTION VIII - TRANSPORTATION DATA

44	UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
47	NA		
45	REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	I.D. NUMBER
48	None		49 None
TRANSPORTATION EMERGENCY INFORMATION		RO	LABEL(S) REQUIRED
CHEM TREC		50	51 None for domestic transportation
1-800-424-9300		FREIGHT CLASSIFICATION	
		52 Liquid Plastic Material/NOIBN. Domestic - Drums	
		SPECIAL TRANSPORTATION NOTES	
53	None		

### SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC MATERIAL AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT OR SPARKS WITH A THERMAL BARRIER.

54

SIGNATURE	<i>William</i>	TITLE	Sales Service Supervisor
REVISION DATE	9/30/88	SENT TO	ATTN:
SUPERSEDES			DATE

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.



# MATERIAL SAFETY DATA SHEET

PRODUCT SR-0486A

HAZARD RATING N F P A	4 - EXTREME	Fire Reactivity Toxicity Special
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	



**Isofoam® Systems**

Triumph Industrial Park, 505 Blue Ball Road  
P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE  
MANUFACTURER  
(301) 392-4800  
CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY 3 <u>Reactive Isocyanates</u>	FORMULA 4 <u>Proprietary</u>
--	---------------------------------

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

CHEMICAL	PHYSICAL
HAZARDOUS DECOMPOSITION PRODUCTS 5 <u>Oxides of carbon and nitrogen</u>	FORM 8 <u>Liquid</u>
INCOMPATIBILITY (KEEP AWAY FROM) 6 <u>Water (moisture), Alcohols, Amines, Strong Acids and Bases</u>	ODOR 9 <u>Sharp Pungent TDI Odor</u>
LIST ALL TOXIC AND HAZARDOUS INGREDIENTS 7 <u>80/20 2, 4/2, 6 - Toluene Diisocyanate Ca 40% CAS 26471-62-5</u>	APPEARANCE 10 <u>Amber Liquid</u>
	COLOR 11
	SPECIFIC GRAVITY 12 (WATER = 1) <u>NDA @ 25°C</u>
	BOILING PT. 13
	MELTING PT. 14
	SOLUBILITY IN WATER 15 <u>Reacts</u>
	% VOLATILE (BY WT %) 16 <u>NDA</u>
	EVAP. RATE 17 (Water = 1) <u>NDA</u>
	VAPOR PRESSURE 18 (mm Hg at 20°C) <u>40.011</u>
	VAPOR DENSITY (AIR = 1) 19 <u>NDA</u>
	pH AS IS 20 pH (XXX) <u>NDA</u>
	STRONG ACID <input type="checkbox"/>
	STRONG BASE <input type="checkbox"/>
	STABLE <input checked="" type="checkbox"/>
	UNSTABLE <input type="checkbox"/>
	VISCOSITY SUS AT 100°F 22 <u>NDA</u>
	23 <u>2,000 cps @ 25°C</u>
	Viscosity @ 25°C cps

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES 24 <u>Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.</u>	FLASH POINT (METHOD USED) 25 <u>C.O.C.</u> 26 <u>135 °C 276 °F</u>
UNUSUAL FIRE AND EXPLOSION HAZARDS 25 <u>Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.</u>	FLAMMABLE LIMITS % 27 <u>LOWER NDA UPPER NDA</u>
	EXTINGUISHING AGENTS 28 <input checked="" type="checkbox"/> DRY CHEMICAL <input checked="" type="checkbox"/> CO <sub>2</sub> <input checked="" type="checkbox"/> WATER SPRAY <input checked="" type="checkbox"/> FOAM <input type="checkbox"/> WATER FOG <input type="checkbox"/> SAND/EARTH <input type="checkbox"/> OTHER

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR) 29 <u>0.005 ppm - O.S.H.A. TLV for TDI</u>
EFFECTS OF OVEREXPOSURE 30 <u>Irritant to eyes &amp; respiratory tract. May cause headaches, nausea, coughing, shortness of breath, &amp; chest discomfort. May result in respiratory distress.</u>
TOXICOLOGICAL PROPERTIES 31 <u>May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.</u>
EMERGENCY FIRST AID PROCEDURES 32 <u>In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.</u>
33 <u>Wash thoroughly with soap and water. Remove contaminated clothing &amp; discard contaminated shoes. Wash clothing before reuse.</u>
34 <u>Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.</u>
35 <u>Call a physician immediately.</u>

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

< = LESS THAN

> = MORE THAN

# IPI

## MATERIAL SAFETY DATA SHEET

PRODUCT SR-0486A

### SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)  Mechanical; to maintain vapors below the TDI TLV = 0.005 ppm	PROTECTIVE GLOVES Impervious rubber or plastic
RESPIRATORY PROTECTION (SPECIFY TYPE)  Use NIOSH approved breathing apparatus.	EYE PROTECTION Safety goggles and face shield to avoid splashing on face.  OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air & splash apron.

### SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO <sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.
WASTE DISPOSAL  Dispose of consistent with Federal, State, and local regulations.

### SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE  Avoid contact with moisture. Isocyanates react with water and generate CO <sub>2</sub> which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C).
--

### SECTION VIII - TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME NA	
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS NA	I.D. NUMBER NA
TRANSPORTATION EMERGENCY INFORMATION  CHEM TREC 1-(800) 424-9300	RQ 50	LABEL(S) REQUIRED NA
	FREIGHT CLASSIFICATION Liquid Plastic Material/NOIBN	
	SPECIAL TRANSPORTATION NOTES None	

### SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.
---

SIGNATURE <u><i>Chapman</i></u>  REVISION DATE <u>11/20/85</u>  SUPERSEDES _____	TITLE <u>Sales Service Supervisor</u>  SENT TO ATTN: _____ DATE _____
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IPI

## MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> SR-0609A
 HAZARD RATING  
 4 - EXTREME  
 3 - HIGH  
 2 - MODERATE  
 1 - SLIGHT  
 0 - INSIGNIFICANT

 Fire  
 Reactivity  
 Toxicity  
 Special

## SECTION I

IPI

Isofoam<sup>®</sup> Systems
 Triumph Industrial Park, 505 Blue Ball Road  
 P.O. Box 70, Elkton, MD 21921 (301/392-4800)

 EMERGENCY TELEPHONE  
 MANUFACTURER  
 (301) 392-4800  
 CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY

FORMULA

3 Toluene Diisocyanate (TDI) Prepolymer

4 Proprietary

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

## CHEMICAL

## - PHYSICAL

HAZARDOUS DECOMPOSITION PRODUCTS

5 Oxides of Carbon and Nitrogen

INCOMPATIBILITY (KEEP AWAY FROM)

6 Water (moisture), Alcohols, Amines, Strong Acids and Bases

LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

 Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI)  
 Prepolymers

## SECTION III - FIRE AND EXPLOSION DATA

 SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be  
 equipped to prevent breathing of vapors  
 or products of combustion. Must wear  
 self-contained breathing apparatus.
FLASH POINT (METHOD USED)  
C.O.C.

26 133 °C 273 °F

FLAMMABLE LIMITS %

27 LOWER NDA UPPER NDA

UNUSUAL FIRE AND EXPLOSION HAZARDS

 Avoid moisture  
 contamination in closed containers. Reaction  
 with moisture will generate CO<sub>2</sub> which  
 may rupture the container.

EXTINGUISHING AGENTS

☒ DRYCHEMICAL ☒ CO<sub>2</sub>☒ WATERSPRAY ☒ FOAM☐ WATERFOG ☐ SAND/EARTH28 ☐ OTHER

FORM

8 liquid

ODOR

9 Sharp Pungent

TDI Odor

APPEARANCE

10 Liquid

COLOR

11 Hazy Yellow

SPECIFIC GRAVITY

12 (WATER = 1) 1.17 @ 25 °C

BOILING PT.

118 °C

246 °F

MELTING PT.

NDA °C

NDA °F

SOLUBILITY  
IN WATER

AT NA °C Reacts

% VOLATILE  
(BY WT %)

NDA

EVAP. RATE

17 (Water = 1) NDA

VAPOR PRESSURE

18 (mm Hg at 20 °C) &lt; 0.011

VAPOR DENSITY  
(AIR = 1)

NDA

pH AS IS

NDA

20 pH (X X X) NDA

STRONG ACID ☐STRONG BASE ☐STABLE ☒UNSTABLE ☐

VISCOSITY

SUS

AT 100 °F

NDA

Viscosity @ 25 °C

3200 cps

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE

 Irritant to eyes & respiratory tract. May  
 cause headaches, nausea, coughing, shortness of breath, &  
 chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES

 May cause allergic skin or respiratory  
 reaction. Persons with known respiratory allergies should  
 avoid exposure to this product.

EMERGENCY FIRST AID PROCEDURES

 In case of eye contact, flush with plenty of water for  
 32 EYES at least 15 minutes. Call a physician.

33 SKIN CONTACT

 Wash thoroughly with soap and water. Remove  
 contaminated clothing & discard contaminated  
 shoes. Wash clothing before reuse.

34 INHALATION

Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

35 IF SWALLOWED

Call a physician immediately

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt; = LESS THAN

&gt; = MORE THAN

## MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> SR 0609A

### SECTION V — SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid

splashing on face.

OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air & splash apron.

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

### SECTION VI — HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

WASTE DISPOSAL

Dispose of consistent with Federal, State, and local regulations.

### SECTION VII — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80 F (5 and 27 C).

### SECTION VIII — TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME		
	47	NA	
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS		I.D. NUMBER
	48	NA	49 NA
TRANSPORTATION EMERGENCY INFORMATION	RQ	LABEL(S) REQUIRED	
	50	51 NA	
	FREIGHT CLASSIFICATION		
CHEM TRFC	52	Liquid Plastic Material/NOIBN	
1-800-424-9300	SPECIAL TRANSPORTATION NOTES		
	53	None	

### SECTION IX — COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

SIGNATURE <u><i>Chill/are</i></u>	TITLE <u>Sales Service Supervisor</u>		
REVISION DATE <u>7/3/84</u>	SENT TO	ATTN:	DATE
SUPERSEDES			

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

**IPI****MATERIAL SAFETY DATA SHEET**PRODUCT ISOFOAM<sup>R</sup> SR-0672A

HAZARD RATING N F P A	4 - EXTREME	Five 
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

**SECTION I**

1 MANUFACTURING DIVISION OR SUBSIDIARY <b>IPI</b>		EMERGENCY TELEPHONE MANUFACTURER <b>(301) 392-4800</b> CHEM TREC 1-(800) 424-9300
2 ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) <b>505 Blue Ball Road, Elkton, Maryland 21921</b>		
3 CHEMICAL NAME OR FAMILY <b>Toluene Diisocyanate (TDI) Prepolymer</b>	4 FORMULA <b>Proprietary</b>	

**SECTION II - CHEMICAL AND PHYSICAL PROPERTIES**

CHEMICAL	PHYSICAL
HAZARDOUS DECOMPOSITION PRODUCTS 5 <b>Oxides of Carbon and Nitrogen</b>	FORM 8 <b>liquid</b>
INCOMPATIBILITY (KEEP AWAY FROM) 6 <b>Water (moisture), Alcohols, Amines, Strong Acids and Bases</b>	ODOR 9 <b>Sharp Pungent</b> <b>TDI Odor</b>
LIST ALL TOXIC AND HAZARDOUS INGREDIENTS 7 <b>Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI) Prepolymers</b> <b>% NCO = 15% MAX.</b>	APPEARANCE 10 <b>Liquid</b> COLOR 11 <b>YELLOW</b>
	SPECIFIC GRAVITY 12 (WATER = 1) <b>1.11 @ 25°C</b>
	BOILING PT. 13 <b>150 °C</b> <b>300 °F</b>
	MELTING PT. 14 <b>NDA °C</b> <b>NDA °F</b>
	SOLUBILITY IN WATER 15 <b>AT NA °C</b> <b>Reacts</b>
	% VOLATILE (BY WT %) 16 <b>NDA</b>
	EVAP. RATE 17 (Water = 1) <b>NDA</b>
	VAPOR PRESSURE 18 (mm Hg at 20 °C) <b>&lt; 0.011</b>
	VAPOR DENSITY (AIR = 1) 19 <b>NDA</b>
	pH AS IS 20 <b>NDA</b>
	pH (X X X) 20 <b>NDA</b>
	STRONG ACID <input type="checkbox"/> STRONG BASE <input type="checkbox"/> STABLE <input checked="" type="checkbox"/> UNSTABLE <input type="checkbox"/>
	21
	VISCOSITY SUS AT 100 °F 22 <b>NDA</b>
	23 <b>NDA</b>
	Viscosity @ 25°C <b>NDA cps</b>

**SECTION III - FIRE AND EXPLOSION DATA**

SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.	FLASH POINT (METHOD USED) C.O.C. 26 <b>146 °C 295 °F</b>
24	FLAMMABLE LIMITS % 27 LOWER <b>NDA</b> UPPER <b>NDA</b>
UNUSUAL FIRE AND EXPLOSION HAZARDS Avoid moisture contamination in closed containers. Reaction with moisture will generate CO <sub>2</sub> which may rupture the container.	EXTINGUISHING AGENTS 28 <input checked="" type="checkbox"/> DRYCHEMICAL <input checked="" type="checkbox"/> CO <sub>2</sub> <input checked="" type="checkbox"/> WATERSPRAY <input checked="" type="checkbox"/> FOAM <input type="checkbox"/> WATERFOG <input type="checkbox"/> SAND/EARTH <input type="checkbox"/> OTHER
25	

**SECTION IV - HEALTH HAZARD DATA**

PERMISSIBLE CONCENTRATIONS (AIR) 29 <b>0.02 ppm - O.S.H.A. TLV for TDI</b>
EFFECTS OF OVEREXPOSURE Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.
TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.
EMERGENCY FIRST AID PROCEDURES In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.
32 EYES
33 SKIN CONTACT Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.
34 INHALATION Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.
35 IF SWALLOWED Call a physician immediately

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt; = LESS THAN

&gt; = MORE THAN





## MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> SR-0672A

## SECTION V — SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid

splashing on face.

OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air &amp; splash apron.

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

## SECTION VI — HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

WASTE DISPOSAL

Dispose of consistent with Federal, State and local regulations.

## SECTION VII — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80 F (5 and 27 C).

## SECTION VIII — TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
44	47 NA	
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	
45	48 NA	
TRANSPORTATION EMERGENCY INFORMATION	RO	LABEL(S) REQUIRED
	50	51 NA
	FREIGHT CLASSIFICATION	
CHEM TRFC	52 Liquid Plastic Material/NOIBN	
1 (800) 424-9300	SPECIAL TRANSPORTATION NOTES	
46	53 None	

## SECTION IX — COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

SIGNATURE <i>Cliff Hare</i>	TITLE Sales Service Supervisor		
REVISION DATE 2/5/88	SENT TO	ATTN:	DATE
SUPERSEDES			

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.



**IPI****MATERIAL SAFETY DATA SHEET**PRODUCT SR-0700AHAZARD RATING  
4 - EXTREME  
3 - HIGH  
2 - MODERATE  
1 - SLIGHT  
0 - INSIGNIFICANTFire  
Reactivity  
Toxicity  
Special**IPI****Isofoam® Systems**

Triumph Industrial Park, 505 Blue Ball Road.

P.O. Box 70, Elkton, MD 21921 (301/392-4800)

AGENCY TELEPHONE

FACTORY

392-4800

TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY

3 Reactive Isocyanates

FORMULA

4

Proprietary

**SECTION II - CHEMICAL AND PHYSICAL PROPERTIES****CHEMICAL****PHYSICAL**

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of carbon and nitrogen

5

INCOMPATIBILITY (KEEP AWAY FROM)

Water (moisture), Alcohols, Amines, Strong Acids and Bases

6

LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

Toluene Diisocyanate (TDI)/Polyether Prepolymer Free Isocyanate

7

FORM

Liquid

8

ODOR

TDI Odor

APPEARANCE

Liquid

10

COLOR

Colorless

11

SPECIFIC GRAVITY

(WATER = 1)

1.1 @ 25°C

12

BOILING PT.

41 °C

13

115 °F

MELTING PT.

NDA °C

14

NDA °F

SOLUBILITY  
IN WATER

Reacts

15

AT °C

% VOLATILE  
(BY WT %)

Nil

16

EVAP. RATE

NDA

17

VAPOR PRESSURE

18

(mm Hg at 20 °C)

19

VAPOR DENSITY

(AIR = 1)

NDA

20

pH AS IS

NDA

21

pH ( )

NDA

22

STRONG ACID

23

STRONG BASE

24

STABLE

25

UNSTABLE

26

VISCOSITY

SUS

27

AT 100 °F

28

Viscosity @ 25°C

29

950 cps

**SECTION III - FIRE AND EXPLOSION DATA**

SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

USUAL FIRE AND EXPLOSION HAZARDS Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.

25

FLASH POINT (METHOD USED)

C.O.C.

140 °C 285 °F

26

FLAMMABLE LIMITS %

NDA

27

LOWER UPPER

EXTINGUISHING AGENTS

X DRYCHEMICAL X CO<sub>2</sub>

X WATERSPRAY X FOAM

X WATERFOG X SAND/EARTH

28

OTHER

**SECTION IV - HEALTH HAZARD DATA**

PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE Irritant to eyes &amp; respiratory tract. May cause headaches, nausea, coughing, shortness of breath, &amp; chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

EMERGENCY FIRST AID PROCEDURES

In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.

Wash thoroughly with soap and water. Remove contaminated clothing &amp; discard contaminated shoes. Wash clothing before reuse.

Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt; = LESS THAN

&gt; = MORE THAN

## MATERIAL SAFETY DATA SHEET

PRODUCT SR-0700A

### SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL) Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm	PROTECTIVE GLOVES Impervious rubber or plastic
RESPIRATORY PROTECTION (SPECIFY TYPE) Use NIOSH approved breathing apparatus.	EYE PROTECTION Safety goggles and face shield to avoid splashing on face. OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air & splash apron.

### SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO <sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.
WASTE DISPOSAL Dispose of consistent with Federal, State, and local regulations.

### SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Avoid contact with moisture. Isocyanates react with water and generate CO <sub>2</sub> which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C).
--

### SECTION VIII - TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME NA
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS NA
TRANSPORTATION EMERGENCY INFORMATION  CHEM TREC 1-(800) 424-9300	I.D. NUMBER NA
	LABEL(S) REQUIRED NA
	FREIGHT CLASSIFICATION Liquid Plastic Material/NOIBN
	SPECIAL TRANSPORTATION NOTES None

### SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.
---

SIGNATURE <u>C. DePare</u>	TITLE <u>Sales/Service/Supervisor</u>
REVISION DATE <u>11/3/83</u>	SENT TO ATTN: _____ DATE _____
SUPERSEDES <u>1/16/79</u>	_____

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

IPI

## MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> SR-0832AHAZARD RATING  
4 - EXTREME  
3 - HIGH  
2 - MODERATE  
1 - SLIGHT  
0 - INSIGNIFICANTFire  
Reactivity  
Toxicity  
Special

## SECTION I

IPI

Isofoam<sup>®</sup> Systems

Triumph Industrial Park, 505 Blue Ball Road

P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE  
MANUFACTURER  
(301) 392-4800  
CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY

FORMULA

3 Toluene Diisocyanate (TDI) Prepolymer

4 Proprietary

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

## CHEMICAL

## - PHYSICAL

## HAZARDOUS DECOMPOSITION PRODUCTS

5 Oxides of Carbon and Nitrogen

## INCOMPATIBILITY (KEEP AWAY FROM)

6 Water (moisture), Alcohols, Amines, Strong Acids and Bases

## LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

7 Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI) Prepolymers

## FORM

8 liquid

## ODOR

9 Sharp Pungent  
TDI Odor

## APPEARANCE

10 Liquid

## COLOR

11 Amber Liquid

## SPECIFIC GRAVITY

12 (WATER = 1) 1.10 @ 25 °C

## BOILING PT.

&gt; 121 °C

&gt; 250 °F

## MELTING PT.

NDA °C

NDA °F

SOLUBILITY  
IN WATER

AT NA °C Reacts

% VOLATILE  
(BY WT %)

16 NDA

## EVAP. RATE

17 (Water = 1) NDA

## VAPOR PRESSURE

18 (mm Hg at 20 °C) &lt; 0.011

VAPOR DENSITY  
(AIR = 1)

19 NDA

## pH AS IS

20 pH (X X X) NDA

STRONG ACID ☐STRONG BASE ☐STABLE ☒UNSTABLE ☐VISCOSITY  
SUS  
AT 100 °F

22 NDA

23 NDA

cps

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

FLASH POINT (METHOD USED)  
C.O.C.

26 138 °C 280 °F

## FLAMMABLE LIMITS %

27 LOWER NDA UPPER NDA

## UNUSUAL FIRE AND EXPLOSION HAZARDS

Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.

## EXTINGUISHING AGENTS

☒ DRYCHEMICAL ☒ CO<sub>2</sub>☒ WATERSPRAY ☒ FOAM☐ WATERFOG ☐ SAND/EARTH28 ☐ OTHER

## SECTION IV - HEALTH HAZARD DATA

## PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

## EFFECTS OF OVEREXPOSURE

Irritant to eyes &amp; respiratory tract. May cause headaches, nausea, coughing, shortness of breath, &amp; chest discomfort. May result in respiratory distress.

## TOXICOLOGICAL PROPERTIES

May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

## EMERGENCY FIRST AID PROCEDURES

32 EYES In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.

## 33 SKIN CONTACT

Wash thoroughly with soap and water. Remove contaminated clothing &amp; discard contaminated shoes. Wash clothing before reuse.

## 34 INHALATION

Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

## 35 IF SWALLOWED

Call a physician immediately

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt; = LESS THAN

&gt; = MORE THAN



## MATERIAL SAFETY DATA SHEET

PRODUCT ISOFOAM<sup>R</sup> SR-0832A

## SECTION V — SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

36

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

37

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid

38 splashing on face.

OTHER PROTECTIVE EQUIPMENT

Respirator that provides fresh air &amp; splash apron.

40

## SECTION VI — HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia and detergent.<sup>2</sup> Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

41

WASTE DISPOSAL

Dispose of consistent with Federal, State and local regulations.

42

## SECTION VII — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80 F (5 and 27 C).

43

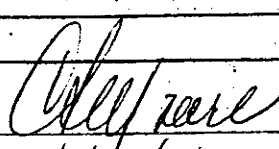
## SECTION VIII — TRANSPORTATION DATA

44	UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
47	NA		
45	REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	I.D. NUMBER
48	NA		49 NA
46	TRANSPORTATION EMERGENCY INFORMATION	50	LABEL(S) REQUIRED
		51	NA
		FREIGHT CLASSIFICATION	
CHEM TRFC		52	Liquid Plastic Material/NOIBN
1 (800) 424-9300		SPECIAL TRANSPORTATION NOTES	
		53	None

## SECTION IX — COMMENTS


NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

54

SIGNATURE		TITLE	Sales Service Supervisor
REVISION DATE	6/20/86	SENT TO	ATTN:
SUPERSEDES			

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

**IPI****MATERIAL SAFETY DATA SHEET**PRODUCT SR-0894A

HAZARD RATING N F P A	4 - EXTREME	
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

**SECTION I****IPI****Isofoam® Systems**

Triumph Industrial Park, 505 Blue Ball Road

P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE  
MANUFACTURER  
(301) 392-4800  
CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY

3 Reactive Isocyanates

FORMULA

4 Proprietary**SECTION II - CHEMICAL AND PHYSICAL PROPERTIES****CHEMICAL****PHYSICAL**

HAZARDOUS DECOMPOSITION PRODUCTS

5 Oxides of carbon and nitrogen

INCOMPATIBILITY (KEEP AWAY FROM)

6 Water (moisture), Alcohols, Amines, Strong Acids and Bases

LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

7 Toluene Diisocyanate (TDI)/Polyether Prepolymer  
24% Free Isocyanate

FORM

8 Liquid

ODOR

9 TDI Odor

APPEARANCE

10 Liquid

COLOR

11 Dark Brown

SPECIFIC GRAVITY

12 (WATER = 1) 1.15 @ 25°C

BOILING PT.

128 °C263 °F

MELTING PT.

NDA °CNDA °FSOLUBILITY  
IN WATERAT \_\_\_\_\_ °C Reacts% VOLATILE  
(BY WT %)Nil

EVAP. RATE

17 (\_\_\_\_\_ = 1) NDAVAPOR PRESSURE  
(mm Hg at 20 °C)VAPOR DENSITY  
(AIR = 1)NDApH AS IS  
20 pH ( ) NDASTRONG ACID \_\_\_\_\_ ☐  
STRONG BASE \_\_\_\_\_ ☐  
STABLE \_\_\_\_\_ ☐  
UNSTABLE \_\_\_\_\_ ☐VISCOSITY  
SUS < 100 ☐  
AT 100 °F 100 OR > ☐Viscosity @ 25°C 130 cps**SECTION III - FIRE AND EXPLOSION DATA**

SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

FLASH POINT (METHOD USED)

C.O.C.

26 148 °C 298 °F

FLAMMABLE LIMITS %

27 NDA

LOWER \_\_\_\_\_ UPPER \_\_\_\_\_

EXTINGUISHING AGENTS

☒ DRYCHEMICAL ☒ CO,  
☒ WATERSPRAY ☒ FOAM☐ WATERFOG ☐ SAND/EARTH28 ☐ OTHER \_\_\_\_\_

UNUSUAL FIRE AND EXPLOSION HAZARDS

Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.**SECTION IV - HEALTH HAZARD DATA**

PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE

30 Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath & chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES

May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

EMERGENCY FIRST AID PROCEDURES

32 In case of eye contact, flush with plenty of water for EYES at least 15 minutes. Call a physician.

33 SKIN CONTACT

Wash thoroughly with soap & water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.

34 INHALATION

Remove from contaminate area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

35 IF SWALLOWED

Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt; = LESS THAN

&gt; = MORE THAN



# MATERIAL SAFETY DATA SHEET

PRODUCT SR-0894A**SECTION V - SPECIAL PROTECTION INFORMATION**

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

*Mechanical; to maintain vapors below the TDI TLV = 0.02ppm*

36

RESPIRATORY PROTECTION (SPECIFY TYPE)

*Use NIOSH approved breathing apparatus.*

37

PROTECTIVE GLOVES

*Impervious rubber or plastic.*

38

EYE PROTECTION

*Safety goggles and face shield to avoid*

39

*splashing on face.*

OTHER PROTECTIVE EQUIPMENT

*Respirator that provides**fresh air & splash apron.*

40

**SECTION VI - HANDLING OF SPILLS OR LEAKS**

PROCEDURES FOR CLEAN-UP

*With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.*

41

WASTE DISPOSAL

*Dispose of consistent with Federal, State, and local regulations.*

42

**SECTION VII - SPECIAL PRECAUTIONS**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

*Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 & 80 °F (5 and 27°C).*

43

**SECTION VIII - TRANSPORTATION DATA**

44	UNREGULATED BY D.O.T.	<input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME		
			NA		
45	REGULATED BY D.O.T.	<input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS		I.D. NUMBER
			NA		49 NA
46	TRANSPORTATION EMERGENCY INFORMATION	RQ		LABEL(S) REQUIRED	
		50		51 NA	
		FREIGHT CLASSIFICATION			
		52 Liquid Plastic Material/NOIBN			
CHEM TREC		SPECIAL TRANSPORTATION NOTES			
1-(800) 424-9300		53 None			

**SECTION IX - COMMENTS**

**NOTE:** THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

54

SIGNATURE		TITLE	Sales/Service/Supervisor
REVISION DATE		SENT TO	ATTN:
SUPERSEDES			

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PRODUCT SR-0968A

HAZARD RATING N F P A	4 - EXTREME	Fire Reactivity Toxicity Special
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

### 1 Isocyanate Products Incorporated

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

2 505 Blue Ball Road Elkton, MD 21921

CHEMICAL NAME OR FAMILY

3 Reactive Isocyanates

FORMULA

4 Proprietary

EMERGENCY TELEPHONE

MANUFACTURER

301-392-4800

CHEM TREC 1-(800) 424-9300

### SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

#### CHEMICAL

#### PHYSICAL

HAZARDOUS DECOMPOSITION PRODUCTS		FORM	
Oxides of carbon and nitrogen		8 <u>Liquid</u>	
INCOMPATIBILITY (KEEP AWAY FROM)		ODOR	
Water(moisture), Alcohols, Amines, Strong Acids and Bases		9 <u>TDI Odor</u>	
LIST ALL TOXIC AND HAZARDOUS INGREDIENTS		APPEARANCE	
Toluene Diisocyanate (TDI)/Polyether Prepolymer Free		10 <u>Liquid</u>	
Isocyanate		COLOR	
		11 <u>Orange - Yellow</u>	
		SPECIFIC GRAVITY (WATER = 1)	
		12 <u>1.1 @ 25°C</u>	
		BOILING PT.	
		13 <u>121 °C</u> <u>250 °F</u>	
		MELTING PT.	
		14 <u>NDA °C</u> <u>NDA °F</u>	
		SOLUBILITY IN WATER	
		AT _____ °C <u>Reacts</u>	
		% VOLATILE (BY WT %)	
		16 <u>Nil</u>	
		EVAP. RATE	
		17 (_____ = 1) <u>NDA</u>	
		VAPOR PRESSURE	
		18 (mm Hg at 20°C) _____	
		VAPOR DENSITY (AIR = 1)	
		19 <u>NDA</u>	
		pH AS IS	
		20 pH ( ) <u>NDA</u>	
		STRONG ACID <input type="checkbox"/>	
		STRONG BASE <input type="checkbox"/>	
		STABLE <input type="checkbox"/>	
		UNSTABLE <input type="checkbox"/>	
		21	
		VISCOSITY SUS AT 100 °F	
		22 <u>&lt;100 □</u> <u>100 OR &gt; □</u>	
		23	
		Viscosity @ 25°C	
		2000 cps	

### SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES		FLASH POINT (METHOD USED)	
Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.		C.O.C.	
		25 <u>138 °C</u> <u>280 °F</u>	
		FLAMMABLE LIMITS %	
		27 <u>NDA</u>	
		27 LOWER _____ UPPER _____	
USUAL FIRE AND EXPLOSION HAZARDS		EXTINGUISHING AGENTS	
Avoid moisture contamination in closed containers. Reaction with moisture will generate CO <sub>2</sub> which may rupture the container.		<input checked="" type="checkbox"/> DRYCHEMICAL <input checked="" type="checkbox"/> CO <sub>2</sub>	
		<input checked="" type="checkbox"/> WATERSPRAY <input checked="" type="checkbox"/> FOAM	
		<input type="checkbox"/> WATERFOG <input type="checkbox"/> SAND/EARTH	
		28 <input type="checkbox"/> OTHER _____	

### SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR)	
29 <u>0.02 ppm - O.S.H.A. TLV for TDI</u>	
EFFECTS OF OVEREXPOSURE	
Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.	
TOXICOLOGICAL PROPERTIES	
May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.	
EMERGENCY FIRST AID PROCEDURES	
In case of eye contact, flush with plenty of water for	
32 EYES	at least 15 minutes. Call a physician.
33 SKIN CONTACT	Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.
34 INHALATION	Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.
35 IF SWALLOWED	Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

<= LESS THAN

>= MORE THAN

## SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)		PROTECTIVE GLOVES	
Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm		Impervious rubber or plastic	
RESPIRATORY PROTECTION (SPECIFY TYPE)		EYE PROTECTION	
Use NIOSH approved breathing apparatus.		Safety goggles and face shield to avoid splashing on face.	
		OTHER PROTECTIVE EQUIPMENT	
		Respirator that provides fresh air & splash apron.	

## SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP	With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO <sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.
WASTE DISPOSAL	Dispose of consistent with Federal, State, and local regulations.

## SECTION VII - SPECIAL PRECAUTIONS

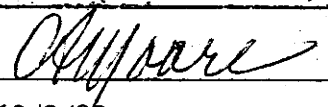
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Avoid contact with moisture. Isocyanates react with water and generate CO <sub>2</sub> which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C).

## SECTION VIII - TRANSPORTATION DATA

UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME		
	NA		
REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS		I.D. NUMBER
	NA		NA
TRANSPORTATION EMERGENCY INFORMATION	RD	LABEL(S) REQUIRED	
		NA	
	FREIGHT CLASSIFICATION		
CHEM TREC	Liquid Plastic Material/NOIBN		
T-(800) 424-9300	SPECIAL TRANSPORTATION NOTES		
	None		

## SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.
---

SIGNATURE 	TITLE Sales/Service/Supervisor		
REVISION DATE 10/3/83	SENT TO	ATTN:	DATE
SUPERSEDES NEW			

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.





## MATERIAL SAFETY DATA SHEET

PRODUCT CASTOMER<sup>R</sup> E-600A

HAZARD RATING N F P A	4 - EXTREME	Five Reactivity Toxicity Special
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

## SECTION I

WITCO MANUFACTURING DIVISION OR SUBSIDIARY

1 I. P. Inc.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

2 505 Blue Ball Road, Elkton, Maryland 21921

CHEMICAL NAME OR FAMILY

3 Toluene Diisocyanate (TDI) Prepolymer

FORMULA

4 Proprietary

EMERGENCY TELEPHONE

MANUFACTURER

(301) 392-4800

CHEM TREC 1-(800) 424-9300

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

## CHEMICAL

## - PHYSICAL

HAZARDOUS DECOMPOSITION PRODUCTS

5 Oxides of Carbon and Nitrogen

INCOMPATIBILITY (KEEP AWAY FROM)

6 Water (moisture), Alcohols, Amines, Strong Acids and Bases

LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

7 Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI) Prepolymers

FORM

8 liquid

ODOR

9 Sharp Pungent

TDI Odor

APPEARANCE

10 Liquid

COLOR

11 Clear Amber

SPECIFIC GRAVITY

12 (WATER = 1)

1.05 @ 25°C

BOILING PT.

&gt; 204 °C

13

&gt; 400 °F

MELTING PT.

NDA °C

14

NDA °F

SOLUBILITY  
IN WATER

AT NA °C

Reacts

15 % VOLATILE  
(BY WT %)

NDA

EVAP. RATE

17 (Water = 1)

NDA

VAPOR PRESSURE

18 (mm Hg at 20°C)

&lt; 0.011

VAPOR DENSITY

19 (AIR = 1)

NDA

pH AS IS

NDA

20 pH X X X

NDA

STRONG ACID ☐STRONG BASE ☐STABLE ☒UNSTABLE ☐

21

VISCOSITY

SUS

22 AT 100°F

NDA

23

Viscosity @ 25°C

1,350 CPS

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be

equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

24

UNUSUAL FIRE AND EXPLOSION HAZARDS

Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.

25

FLASH POINT (METHOD USED)

C.O.C.

26 204 °C 400 °F

FLAMMABLE LIMITS %

27 LOWER NDA UPPER NDA

EXTINGUISHING AGENTS

☒ DRYCHEMICAL ☒ CO<sub>2</sub>☒ WATERSPRAY ☒ FOAM☐ WATERFOG ☐ SAND/EARTH☐ OTHER

28

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE

Irritant to eyes &amp; respiratory tract. May cause headaches, nausea, coughing, shortness of breath, &amp; chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES

May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

EMERGENCY FIRST AID PROCEDURES

32 EYES In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.

33 SKIN CONTACT

Wash thoroughly with soap and water. Remove contaminated clothing &amp; discard contaminated shoes. Wash clothing before reuse.

34 INHALATION

Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

35 IF SWALLOWED

Call a physician immediately

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt;= LESS THAN

&gt;= MORE THAN



## MATERIAL SAFETY DATA SHEET

PRODUCT CUSTOMER<sup>R</sup> E-600A

## SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

36

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

37

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid splashing on face.

OTHER PROTECTIVE EQUIPMENT Respirator that provides fresh air &amp; splash apron.

## SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP

With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

41

WASTE DISPOSAL

Dispose of consistent with Federal, State and local regulations.

42

## SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80 F (5 and 27 C).

43

## SECTION VIII - TRANSPORTATION DATA

44	UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
47	NA		
45	REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	I.D. NUMBER
48	NA		49 NA
TRANSPORTATION EMERGENCY INFORMATION  CHEM TRFC 1 (800) 424-9300		50 RQ	51 LABEL(S) REQUIRED
		52	NA
		FREIGHT CLASSIFICATION	
		52	Liquid Plastic Material/NOIBN
		SPECIAL TRANSPORTATION NOTES	
53	None		

## SECTION IX - COMMENTS

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

54

SIGNATURE		TITLE	Sales Service Supervisor
REVISION DATE	7/18/86	SENT TO	ATTN:
SUPERSEDES			DATE

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IPI

## MATERIAL SAFETY DATA SHEET

PRODUCT E-0852A

HAZARD RATING N F P A	4 - EXTREME	Fire Reactivity Toxicity Special
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

IPI

Isofoam® Systems

Triumph Industrial Park, 505 Blue Ball Road

P.O. Box 70, Elkton, MD 21921 (301/392-4800)

EMERGENCY TELEPHONE

MANUFACTURER

(301) 392-4800

CHEM TREC 1-(800) 424-9300

CHEMICAL NAME OR FAMILY

3 Reactive Isocyanates

FORMULA

4 Proprietary

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

## CHEMICAL

## PHYSICAL

## HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of carbon and nitrogen

5

## INCOMPATIBILITY (KEEP AWAY FROM)

Water (moisture), Alcohols, Amines, Strong Acids and Bases

6

## LIST ALL TOXIC AND HAZARDOUS INGREDIENTS

Toluene Diisocyanate (TDI)/Polyether Prepolymer  
Free Isocyanate

7

## FORM

Liquid

8

ODOR Sharp Pungent  
TDI Odor

## APPEARANCE

Liquid

10

## COLOR

11

## SPECIFIC GRAVITY

(WATER = 1)

0.02 @ 25°C

12

## BOILING PT.

&gt; 149 °C

13

&gt; 300 °F

## MELTING PT.

NDA °C

14

NDA °F

SOLUBILITY  
IN WATER

AT NA °C

15

Reacts

% VOLATILE  
(BY WT %)

16

NDA

## EVAP. RATE

17

(Water = 1)

NDA

## VAPOR PRESSURE

(mm Hg at 20 °C)

18

0.011

## VAPOR DENSITY

(AIR = 1)

19

NDA

## pH AS IS

pH (XXX)

20

NDA

STRONG ACID ☐

STRONG BASE ☐

STABLE ☒

UNSTABLE ☐

21

VISCOSITY  
SUS  
AT 100 °F

22

NDA

23

Viscosity @ 25°C

450 cps

## SECTION III - FIRE AND EXPLOSION DATA

## SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.

24

## FLASH POINT (METHOD USED)

C.O.C.

25 &gt; 121 °C &gt; 250 °F

## FLAMMABLE LIMITS %

27 LOWER NDA UPPER NDA

## UNUSUAL FIRE AND EXPLOSION HAZARDS

Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.

25

## EXTINGUISHING AGENTS

X DRYCHEMICAL X CO<sub>2</sub>

X WATERSPRAY X FOAM

X WATERFOG X SAND/EARTH

28

OTHER

## SECTION IV - HEALTH HAZARD DATA

## PERMISSIBLE CONCENTRATIONS (AIR)

29 0.02 ppm - O.S.H.A. TLV for TDI

EFFECTS OF OVEREXPOSURE Irritant to eyes &amp; respiratory tract. May cause headaches, nausea, coughing, shortness of breath, &amp; chest discomfort. May result in respiratory distress.

TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

## EMERGENCY FIRST AID PROCEDURES

In case of eye contact, flush with plenty of water for  
32 EYES at least 15 minutes. Call a physician.

Wash thoroughly with soap and water. Remove contaminated clothing &amp; discard contaminated shoes. Wash clothing before reuse.

Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

Call a physician immediately.

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

&lt; = LESS THAN

&gt; = MORE THAN

## 

PRODUCT E-0852A

### 

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

36

RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

37

PROTECTIVE GLOVES

Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid splashing on face.

OTHER PROTECTIVE EQUIPMENT

Respirator that provides fresh air & splash apron.

### 

PROCEDURES FOR CLEAN-UP With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 50% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.

41

WASTE DISPOSAL

Dispose of consistent with Federal, State, and local regulations.

42

### 

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80°F (5 and 27°C).

43

### 

44	UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
		NA	
45	REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	
		NA	
		I.D. NUMBER	
		49	NA
	TRANSPORTATION EMERGENCY INFORMATION	RQ	LABEL(S) REQUIRED
		50	51 NA
	CHEM TREC	FREIGHT CLASSIFICATION	
	1-(800) 424-9300	52 Liquid Plastic Material/NOIBN	
		SPECIAL TRANSPORTATION NOTES	
		53 None	

### 

NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

54

SIGNATURE

*[Signature]*

TITLE Sales Service Supervisor

REVISION DATE

6/10/86

SENT TO ATTN:

DATE

SUPERSEDES

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# MATERIAL SAFETY DATA SHEET

PRODUCT CUSTOMER<sup>R</sup> E-0866A

HAZARD RATING N F P A	4 - EXTREME	
	3 - HIGH	
	2 - MODERATE	
	1 - SLIGHT	
	0 - INSIGNIFICANT	

## SECTION I

MANUFACTURING DIVISION OR SUBSIDIARY 1 <u>IPI</u>		EMERGENCY TELEPHONE MANUFACTURER <u>(301) 392-4800</u> CHEM TREC 1-(800) 424-9300
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) 2 <u>505 Blue Ball Road, Elkton, Maryland 21921</u>		
CHEMICAL NAME OR FAMILY 3 <u>Toluene Diisocyanate (TDI) Prepolymer</u>	FORMULA 4 <u>Proprietary</u>	

## SECTION II - CHEMICAL AND PHYSICAL PROPERTIES

CHEMICAL	- PHYSICAL
HAZARDOUS DECOMPOSITION PRODUCTS	FORM 8 <u>liquid</u>
5 <u>Oxides of Carbon and Nitrogen</u>	ODOR 9 <u>Sharp Pungent</u>
INCOMPATIBILITY (KEEP AWAY FROM)	<u>TDI Odor</u>
6 <u>Water (moisture), Alcohols, Amines, Strong Acids and Bases</u>	APPEARANCE 10 <u>Liquid</u>
LIST ALL TOXIC AND HAZARDOUS INGREDIENTS	COLOR 11 <u>Clear Liquid</u>
<u>Toluene Diisocyanate (TDI) and Toluene Diisocyanate (TDI)</u>	SPECIFIC GRAVITY 12 (WATER = 1) <u>1.07 @ 25°C</u>
7 <u>Prepolymers</u>	BOILING PT. <u>&gt; 177 °C</u> <u>&gt; 350 °F</u>

## SECTION III - FIRE AND EXPLOSION DATA

SPECIAL FIRE FIGHTING PROCEDURES Firefighters must be equipped to prevent breathing of vapors or products of combustion. Must wear self-contained breathing apparatus.	FLASH POINT (METHOD USED) C.O.C. 26 <u>152 °C 305 °F</u>
24 UNUSUAL FIRE AND EXPLOSION HAZARDS <u>Avoid moisture contamination in closed containers. Reaction with moisture will generate CO<sub>2</sub> which may rupture the container.</u>	FLAMMABLE LIMITS % 27 LOWER <u>NDA</u> UPPER <u>NDA</u>
25	EXTINGUISHING AGENTS <input checked="" type="checkbox"/> DRYCHEMICAL <input checked="" type="checkbox"/> CO. <input checked="" type="checkbox"/> WATERSPRAY <input checked="" type="checkbox"/> FOAM <input type="checkbox"/> WATERFOG <input type="checkbox"/> SAND/EARTH 28 <input type="checkbox"/> OTHER

## SECTION IV - HEALTH HAZARD DATA

PERMISSIBLE CONCENTRATIONS (AIR) 29 <u>0.02 ppm - O.S.H.A. TLV for TDI</u>	
EFFECTS OF OVEREXPOSURE Irritant to eyes & respiratory tract. May cause headaches, nausea, coughing, shortness of breath, & chest discomfort. May result in respiratory distress.	
TOXICOLOGICAL PROPERTIES May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.	
EMERGENCY FIRST AID PROCEDURES 32 EYES In case of eye contact, flush with plenty of water for at least 15 minutes. Call a physician.	
33 SKIN CONTACT	Wash thoroughly with soap and water. Remove contaminated clothing & discard contaminated shoes. Wash clothing before reuse.
34 INHALATION	Remove from contaminated area to fresh air environment. Call a physician. If victim is not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.
35 IF SWALLOWED	Call a physician immediately

13	MELTING PT.	<u>NDA</u> °C <u>NDA</u> °F
14	SOLUBILITY IN WATER	<u>Reacts</u>
15	AT <u>NA</u> °C	
16	% VOLATILE (BY WT %)	<u>NDA</u>
17	EVAP. RATE	<u>NDA</u>
18	VAPOR PRESSURE (mm Hg at 20 °C)	<u>&lt; 0.011</u>
19	VAPOR DENSITY (AIR = 1)	<u>NDA</u>
20	pH AS IS	<u>NDA</u>
21	pH (X X X)	<u>NDA</u>
22	STRONG ACID	<input type="checkbox"/>
23	STRONG BASE	<input type="checkbox"/>
24	STABLE	<input checked="" type="checkbox"/>
25	UNSTABLE	<input type="checkbox"/>
26	VISCOSITY SUS AT 100 °F	<u>NDA</u>
27	Viscosity @ 25 °C	<u>2,000 cps</u>

NA = NOT APPLICABLE

NDA = NO DATA AVAILABLE

<= LESS THAN

>= MORE THAN



## MATERIAL SAFETY DATA SHEET

PRODUCT CASSTOMER<sup>R</sup> E-0866A

## SECTION V - SPECIAL PROTECTION INFORMATION

VENTILATION TYPE REQUIRED (LOCAL, MECHANICAL, SPECIAL)

Mechanical; to maintain vapors below the TDI TLV = 0.02 ppm

36  
RESPIRATORY PROTECTION (SPECIFY TYPE)

Use NIOSH approved breathing apparatus.

PROTECTIVE GLOVES

38 Impervious rubber or plastic

EYE PROTECTION Safety goggles and face shield to avoid  
39 splashing on face.

OTHER PROTECTIVE EQUIPMENT

40 Respirator that provides fresh air &amp; splash apron.

## SECTION VI - HANDLING OF SPILLS OR LEAKS

PROCEDURES FOR CLEAN-UP

With adequate ventilation, cover with an inert absorbent material such as clay or vermiculite, transfer to a metal container. Saturate with water but DO NOT SEAL THE CONTAINER (CO<sub>2</sub> will be generated). Wash the area with water containing 5% ammonia and detergent. Wear respirator and other protective equipment for protection of eyes and skin during cleanup.41  
WASTE DISPOSAL

42 Dispose of consistent with Federal, State and local regulations.

## SECTION VII - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

43 Avoid contact with moisture. Isocyanates react with water and generate CO<sub>2</sub> which may rupture sealed containers. Store between 40 and 80 F (5 and 27 C).

## SECTION VIII - TRANSPORTATION DATA

44 UNREGULATED BY D.O.T. <input checked="" type="checkbox"/>	U.S. D.O.T. PROPER SHIPPING NAME	
	47 NA	
45 REGULATED BY D.O.T. <input type="checkbox"/>	U.S. D.O.T. HAZARD CLASS	
	48 NA	
46 TRANSPORTATION EMERGENCY INFORMATION  CHEM TRFC 1-800-424-9300	49	I.D. NUMBER
	50	NA
	51	LABEL(S) REQUIRED
	52	NA
	FREIGHT CLASSIFICATION	
	53 Liquid Plastic Material/NOIBN	
	SPECIAL TRANSPORTATION NOTES	
	54 None	

## SECTION IX - COMMENTS

54 NOTE: THE FOAM PRODUCED IS AN ORGANIC AND MUST BE CONSIDERED AS COMBUSTIBLE. THE FOAM MUST NOT BE LEFT EXPOSED OR UNPROTECTED. SHIELD THE FOAM FROM HEAT AND SPARKS WITH A THERMAL BARRIER.

SIGNATURE <u><i>William</i></u>	TITLE <u>Sales Service Supervisor</u>	
REVISION DATE <u>6/25/86</u>	SENT TO	ATTN:
SUPERSEDES	DATE	

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

Attachments for 4.03:

1. Typical product drum label
2. Polyisocyanate Safety Information  
Attached to each "A" container.
3. SPI Bulletin 118-R
4. SPI Bulletin U-11

# ISOFOAM®

# A

## POLYISOCYANATE COMPONENT

CONTAINS: TOLUENE DIISOCYANATE PREPOLYMER

A/B RATIO,

BY WEIGHT

**Danger!** Causes burns. Harmful if inhaled. May cause allergic skin or respiratory reaction. Persons with known respiratory allergies should avoid exposure to this product.

**Contains Reactive Isocyanate Groups.** Do not get in eyes or on skin or clothing. Wear chemical splash goggles and rubber gloves. Use with adequate ventilation. Do not breathe vapor. Use a NIOSH approved respirator. Keep container closed. Wash thoroughly after handling.

**First Aid:** If inhaled, swallowed or in the event of eye contact, call a physician immediately. Flush skin and eyes with large amounts of water for at least 15 minutes. Remove contaminated clothing and discard contaminated shoes. Wash clothing before reuse.

If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen. Call a physician.

**Important Notice:** The foam produced is an organic material. It must be considered as combustible and may constitute a fire hazard. The foam must not be left exposed or unprotected. Shield the foam from heat and sparks by a thermal barrier.

In case of fire, use water spray, foam, dry chemical or CO<sub>2</sub>. Wear positive pressure, self-contained breathing apparatus.

In case of spill or leak, evacuate and ventilate spill area. Cover with inert absorbent material such as sand, earth, or vermiculite. Transfer to waste container. Saturate with water. Do not seal container. Flush residue with water. Wear respiratory and other protective equipment during clean-up. Dispose of consistent with federal, state and local regulations.

Store in a dry place at temperatures of 60-85°F.

**For Industrial Use Only. Do Not Swallow.** Ask for technical data bulletin and material safety data sheet on this product prior to use. Read the attached safety and handling information for further details. Do not reuse empty drums or pails; decontaminate and puncture or crush.

No warranties, expressed or implied, including patent warranties or warranties of merchantability or fitness for use, are made with respect to this product.

# IPI

A Division of PMC, Inc.

Triumph Industrial Park  
505 Blue Ball Road  
P.O. Box 70  
Elkton, MD 21921



may be extinguished with carbon dioxide, dry chemical, or an inert gas. Application of large quantities of water spray is recommended for spill fires. Fire fighters should be equipped with NIOSH approved self-contained breathing apparatus.

## **STORAGE**

Polyisocyanate materials are ideally stored between 60°F and 85°F, away from direct sunlight, and in sealed containers or adequately designed bulk storage tanks. Do not leave containers open.

## **APPLICATION OR USE PRECAUTIONS**

The polyurethane foams produced from polyisocyanates present significant fire risks in certain applications. Once ignited, these foams can burn rapidly and produce intense heat, dense smoke and irritating or toxic gases. All interior building insulation applications of polyurethane foam should be protected from accidental ignition with an appropriate barrier. Wall and ceiling applications should not be considered unless a fire resistive thermal barrier is included having a 15 minute finish rating.

Welding, cutting and other hot work should not be done in areas where polyurethane foam is not protected.

Application equipment must be properly maintained and calibrated to avoid producing off-ratio foam.

Large quantities of foam should not be accumulated in a manner that could retain exothermic heat and possibly result in autoignition. This includes calibration or test shots and scrap foam.

Do not smoke or use naked lights, open flames, space heaters, or other ignition sources near pouring, frothing or spraying operations.

Persons who will work with polyisocyanates should undergo screening physical examinations before initially starting such work in order to eliminate hypersensitive individuals and those who have a history of chronic respiratory illness or allergic response.

Periodically, workers should be rechecked for systemic effects of polyisocyanate exposure. Workers developing asthmatic reaction or other sensitization should be removed from further exposure.

## **SPECIAL EMPHASIS FOR SPRAY APPLICATIONS**

Workers engaged in spraying polyisocyanates must wear positive pressure air-supplied face masks or hoods.

Inspect the application area from the potential to expose other persons or for overspray to drift onto buildings, vehicles or other property. When spraying building exteriors, persons entering or exiting the building as well as those inside could be exposed to polyisocyanates due to wind conditions, open windows or air intakes. Do not begin application work until these potential problems have been corrected.

When spraying building interiors, the foam must not be left as an exposed interior finish on walls or ceilings or in any horizontal or vertical flue-like configuration.

Obtain and read the product data bulletin and material safety data sheet prior to using this material.

If you need additional information contact your IPI representative or call: 301-392-4800.

In case of chemical emergency after hours contact Chemtrec at 800-424-9300.

IPI  
505 Blue Ball Rd.  
P.O. Box 70  
Elkton, MD 21921  
301-392-4800

**IMPORTANT  
SAFETY AND HANDLING INFORMATION  
READ CAREFULLY BEFORE  
WORKING WITH THIS MATERIAL**

# ISOFOAM<sup>®</sup> POLYISOCYANATES

## HANDLING AND SAFETY INFORMATION

***Misuse of this material can be hazardous!  
Read this literature — safety is your  
responsibility.***

### PRIMARY PRECAUTIONS:

- **AVOID BREATHING POLYISOCYANATE VAPORS**
- **AVOID SKIN & EYE CONTACT WITH POLYISOCYANATES**
- **AVOID EATING POLYISOCYANATES**
- **AVOID FLAME SOURCES AROUND POLYISOCYANATES**
- **PROTECT POLYISOCYANATES FROM WATER, MOISTURE, AND OTHER REACTANTS**

### VAPORS, MISTS AND DUST

Polyisocyanates will irritate the nose, throat, lungs and eyes. Symptoms may include watering of the eyes, dryness of the throat, tightness of the chest, headaches, nausea, coughing, and shortness of breath. Some persons can become sensitized to polyisocyanates and suffer asthma-like attacks and respiratory distress when exposed to low concentrations. Persons with known respiratory allergies should avoid exposure to polyisocyanates.

Proper handling, mechanical ventilation and air supplied respirators can be used to avoid exposure to polyisocyanate vapors, mists and dust.

### LIQUIDS

Liquid polyisocyanates can cause severe eye irritation, inflammation, and/or damage to sensitive eye tissue.

Skin contact can cause reddening, irritation, dermatitis, and, in some individuals, sensitization.

Ingestion can cause irritation and damage to mouth, throat, and stomach tissue.

Proper handling, wearing chemical goggles or a face shield, rubber aprons, gloves, and coveralls should be used to avoid contact with liquid polyisocyanates.

### REACTIVITY

Polyisocyanates are highly reactive chemicals and should be handled and stored in a way to avoid

exposure to many common substances including water and moisture.

### FIRST AID

**Inhalation** — remove persons with exposure symptoms from contaminated area immediately. If breathing is labored or difficult, trained personnel should administer oxygen.

**Skin contact** — wipe off excess. Flush with water. Wipe with rubbing alcohol and wash with soap and water. Wash clothing before reuse.

**Eye contact** — flush immediately with clean water for 15 minutes. Obtain medical attention.

**Ingestion** — drink milk and contact a physician. Vomiting can induce a risk of inhaling polyisocyanate liquids or vapors.

### SPILLS

Protect personnel from polyisocyanate vapors and liquids. Dike the spill and collect by appropriate methods for the quantity.

NOTE: Do not seal containers of collected polyisocyanates if moisture contamination was possible. Carbon dioxide generation and ruptured containers could result.

Neutralize the residue with a dilute aqueous ammonia detergent solution (90 parts water, 8 parts Ammonium Hydroxide, 2 parts liquid detergent).

### DISPOSAL

Waste polyisocyanates can be disposed of through licensed disposal agencies or by conversion to solid polyurethanes with proper care. In all cases, Local, State and Federal regulations should be followed.

Empty drums and pails should be decontaminated and punctured to prevent reuse.

### FIRE HAZARDS

Although the flash points are high enough that ISOFOAM polyisocyanates are not considered serious fire risks, these materials will burn if subjected to sufficient heat in the presence of oxygen. Fires

## Guide for the Safe Handling and Use of Polyurethane and Polyisocyanurate Foam Systems

### INTRODUCTION

Polyurethane and polyisocyanurate foam systems consist of several different chemical compounds, some of which may be hazardous to your health and safety if incorrectly used. Since essentially the same chemicals are used in both polyurethane and polyisocyanurate foam systems, the discussions pertaining to polyurethanes in this Guide also will apply to polyisocyanurates.

While many millions of pounds of polyurethane foam systems are processed or applied every year without adverse incident, some cases of personal injury have resulted from improper use or handling of these materials. The purpose of this Guide is to warn

and inform the users of these systems of potential health risks that may be encountered and to emphasize the precautions that must be taken in order to minimize the possibility of accidents or injuries.

This Guide has been developed to provide information regarding the handling and use of polyurethane foam systems. Ultimately, however, responsibility of insuring that those who actually work with or apply polyurethane foam systems rests with the supervisors of the companies, contractors and applicators installing polyurethane foam systems. This Guide, then, is intended to assist in understanding potential risks so that they can be avoided.

### CHEMICAL COMPOSITION OF POLYURETHANE FOAM SYSTEMS

Polyurethane foam systems generally are composed of two reactive mixtures — an isocyanate “side” (A Component) and a blended polyol resin “side” (B Component) supplied either as drum sets, or in bulk to large-volume users with tankage facilities. In use, the two “sides” are metered in the proper ratio of A and B through proportioning pumps to a mixing head or spray gun, where they are intimately mixed, and the mixture is dispensed to produce a finished foam. Although now relatively rare, some foam systems may include a third liquid component, usu-

ally a catalyst blend which, for any of several reasons, is packaged to be fed as a third stream at the applications site. The generic chemical compositions of polyurethane foam systems are listed in Table 1 with the indicated potential hazards.

Solvents are used in cleanup operations and in flushing polyurethane foam dispensing equipment. These solvents may be toxic, flammable or irritants, and the solvent supplier should be consulted regarding the safe handling of any solvents used.

**TABLE 1**

Component	Chemical Composition	Skin Irritant <sup>1</sup>	Potential Sensitizer (Respiratory or Skin)
A Isocyanate	Monomeric, polymeric or prepolymer	Yes	Yes
B Resin Blend	Polyol resin	No	No
	Amines and/or Metallic Salt Catalysts	Yes	Yes (some)
	Chlorofluorocarbon Blowing Agents	No	No
	Silicone Surfactants	No	No
C Catalyst Blend	Amines	Yes	Yes (some)
	Water	No	No

<sup>1</sup>All components, either in liquid or vapor form, can cause injury to the eyes. Unless protection is provided by a mask or hood, safety goggles must be worn during all foaming operations.

## **RISKS AND PRECAUTIONS**

Although the greatest health risk in the use of polyurethane foam systems arises from inhalation of isocyanate vapors or mist, each component, as indicated in Table 1, contains at least one chemical ingredient that can present a potential health risk. The risk is increased when the components are mixed and dispensed. The heat generated by the reacting mixture can vaporize monomeric isocyanates and amines. In spray foam operations, a fine particulate mist of the reacting ingredients also is formed. Both vapor and mist can present a potential risk to the respiratory tract and the eyes.

All personnel who will be working with isocyanates should have pre-employment and periodic medical examinations, including pulmonary function testing. Those with a medical history of chronic respiratory ailments, asthmatic or bronchial attacks, or indications of allergic responses should not handle, use or be around isocyanates. Workers who develop respiratory distress (shortness of breath, chest pain, difficulty in breathing) should be removed from further exposure immediately and examined by a physician.

## **VENTILATION AND RESPIRATORY PROTECTION**

Mechanical ventilation, adequate to draw vapors or aerosols away from the operator's breathing zone, must be provided at work stations and wherever polyurethane chemicals, particularly the isocyanates, are exposed to the atmosphere. In general, inhalation of isocyanate vapor presents a significant health risk in polyurethane pouring or frothing operations, and must be avoided.

While several types of isocyanates are used in making polyurethanes, the three most common are toluene diisocyanate (TDI), used principally in flexible foams; diphenylmethane diisocyanate (MDI), used in making elastoplastics; and polymeric isocyanates (PMDI), used almost exclusively in rigid foam systems. Although polymeric isocyanates typically emit considerably lower concentrations of isocyanate vapor than do toluene diisocyanates under the same conditions, the heat generated in reacting foam mass can create isocyanate vapor concentrations greater than the permissible level even from the polymerics. And it is not only the chemical vapor which is of concern, but also aerosols or mists generated from spraying operations. For this reason, precautions must be taken to protect personnel working with these systems.

Airborne isocyanates, at greater than allowed concentrations, are irritating to the eyes and to the respiratory tract, causing difficulty in breathing, chest discomfort, a productive cough and reduction in lung function. These effects can be immediate or delayed depending on the dose and the individual's tolerance to the chemical. Some individuals can become sensitized to isocyanates and experience severe asthma-like attacks whenever they are subsequently exposed to even minute amounts of isocyanate vapors. Sensitized individuals *must* be

prohibited from working with or near polyurethane foam systems and *must* be restricted from areas where they are used.

To minimize risk of sensitization in susceptible individuals, the Occupational Safety and Health Administration (OSHA) has promulgated a maximum allowable concentration (ceiling value) of 0.02 parts per million (ppm) for isocyanate vapor in air (see note below). Isocyanate vapor concentration in the workplace must be monitored by suitable monitoring equipment. Sufficient ventilation must be provided to maintain isocyanate vapor concentration below 0.02 ppm in all working areas. Local exhaust ventilation systems are recommended to move the vapors away from the operator and any other persons in the area. Where adequate local exhaust ventilation is not feasible, personal respiratory protection must be worn. Because the isocyanate odor threshold for most individuals is in the 0.2 to 0.4 ppm range, if isocyanate vapor can be smelled, the maximum allowable concentration has been exceeded and a hazardous condition exists.

*NOTE: The American Conference of Government Industrial Hygienists (ACGIH) has adopted a Threshold Limit Value (TLV) of 0.005 ppm 8 hour time weighted average (TWA) and a 15-minute Short Term Exposure Limit (STEL) of 0.020 ppm for TDI.*

During temporary periods of high vapor concentration (such as cleaning up spills, cleaning or repairing equipment, pouring or frothing in unventilated confined locations, etc.) respiratory protection must be worn. Cartridge or canister-type masks may be suitable for emergency use

*continued on page 3*

### ***Ventilation, continued from page 2***

during short exposures. During prolonged exposure or exposure to high concentrations of isocyanate vapor, adequate protection can be attained only through the use of positive-pressure air-supplied face masks or hoods, with air supplied from a tank (self-contained breathing apparatus) or from a diaphragm compressor located in an uncontaminated area.

During spray applications of polyurethane foam systems, whether outdoors, indoors or in a spray booth, positive-pressure air-supplied masks or hoods are mandatory. Cannister or cartridge-type respirators generally are not suitable for use during

spraying operations, because overspray and particulate mist tend to clog the filters and quickly render the respirators ineffective. Furthermore, cartridge respirators typically have no mechanism for warning the wearer that the filter is no longer effective. When the wearer can smell isocyanate, overexposure has occurred.

Smoking during pouring, frothing or spraying operations must be strictly prohibited. Certain solvents used in the operations and chlorofluorocarbons used as blowing agents can thermally decompose to highly toxic products when drawn through burning tobacco.

## **SKIN AND EYE PROTECTION**

Isocyanates, and some of the catalysts used in polyurethane applications, can discolor the skin. Prolonged or repeated contact with polyurethane components may also lead to irritation, reddening, blistering, contact dermatitis, or skin sensitizations and should be avoided through the use of protective clothing and rubber gloves.

In spraying operations, because prevention of overspray is difficult, spray personnel should wear disposable coveralls, gloves, hoods and shoe protectors, in addition to the mandatory positive-pressure air-supplied mask or hood.

Liquid isocyanates splashed into the eyes can cause severe irritation, watering and transitory cor-

neal opacity similar to cataracts. Therefore, in operations where positive-pressure air-supplied mask or hoods are not required, all persons handling liquid polyurethane components in open containers must wear chemical-type safety goggles or face shields.

**CAUTION:** *Ordinary safety goggles or face masks will not prevent eye irritation from high concentrations of isocyanate vapors.*

Safety showers and eyewash fountains should be available at or near work stations where polyurethane systems are handled or used, and personnel should be trained in their prompt use in an emergency.

## **FIRST AID**

Persons who suffer an overexposure to polyurethane components by any route or contact should be examined by a physician as soon as possible.

### ***Inhalation***

Persons exhibiting symptoms of overexposure to isocyanate vapor or mist (severe coughing, tightness of chest, labored breathing), which may result from a major spill, must be removed immediately from the contaminated area and kept at rest until medical personnel arrive. If breathing is labored and oxygen inhalation equipment is available, oxygen should be administered by trained personnel. Obtain medical attention immediately.

### ***Eye Contact***

Should a liquid component come in direct contact

with the eyes, immediately flush with copious quantities of clean flowing water, preferably from an eyewash fountain, for at least 15 minutes. Obtain medical attention immediately.

### ***Ingestion***

Although highly improbable, if a polyurethane component is ingested accidentally, have the affected person drink one or two glasses of milk or water. Obtain medical attention immediately. Do not give anything by mouth to an unconscious person. (Transfer at once to medical facility for gastric lavage.)

*continued on page 4*

*First Aid, continued from page 3*

### **Skin Contact**

In case of minor contact, wash with soap and water. If a major contact occurs, remove contaminated clothing and shoes and wash the body with a safety shower or hose stream. Wipe affected areas with clean cloths saturated with rubbing alcohol, followed by soap and water. If swelling or reddening of the skin occurs, obtain medical attention. Decontaminate clothing before reuse by soaking in 8 percent ammonia solution for one hour prior to laundering with hot water and detergent. Discard

all contaminated leather goods, including all shoes, belts, and watchbands.

### **Medical Advice**

The main hazard of TDI is from inhalation of vapor or aerosols. Asthmatic-type symptoms (broncho spasm) may develop and symptoms may be delayed for up to 12 hours. Treatment is essentially symptomatic. TDI is of low oral toxicity. In the unlikely event of ingestion, the hazard is from inhalation of the vapor during swallowing.

## **SPILLS AND WASTE**

If isocyanate or an isocyanate catalyst blend is spilled, evacuate the area. Cleanup personnel must wear respiratory protection.

If a polyol or polyol catalyst blend is spilled, cover with an absorbent material such as sawdust and scoop up into open-top drums. Dispose of as ordinary industrial waste in compliance with pertinent regulations. Wash down area with aqueous detergent.

For isocyanate spills, cover with a dry oil-absorbent material. Scoop up and place in open-top drums. Remove to a safe outdoor area, and treat with a decontamination solution consisting of 90-95 parts water, 3-8 parts concentrated aqueous ammonia solution and 0.2-0.5 parts detergent, thoroughly mixed. Do not seal the drums. Allow the drums to stand for 72-96 hours and dispose of in compliance with pertinent regulations. Wash down spill area with aqueous detergent.

### **DISPOSAL OF WASTE COMPONENTS**

The easiest and most convenient way to utilize surplus polyurethane components is to react the surplus polyol with isocyanate to produce a low quality foam. The foam produced can then be sold as a manufactured product. If surplus components are reacted to produce a foam that is intended to be discarded, EPA would then regulate the reaction of the surplus polyurethane components as on-site treatment of hazardous waste for which the company must obtain an appropriate permit in advance.

**CAUTION:** *The reaction is exothermic which may cause spontaneous combustion (see Combustibility).*

To dispose of waste isocyanate alone, reaction with liquid decontaminant is recommended. The waste isocyanate should be added slowly or in increments, under mechanical stirring, to the decontaminant contained in an open-top drum, under mechanical ventilation or out-doors. Allow the slurry to stand for 24-48 hours, decant the liquid and dispose of the solid material as ordinary industrial waste in compliance with pertinent regulations. TDI is listed as a hazardous waste under section 261.33(f) of EPA's Resource Conservation and Recovery Act (RCRA) and requires special handling for disposal.

### **DISPOSAL OF CONTAINERS**

"Empty" isocyanate drums or other containers should be decontaminated by filling with water or decontamination solution, preferably outdoors. Allow to stand for 24-48 hours, open to the atmosphere. **DO NOT SEAL DRUMS OR CONTAINERS.** Drain the drums and puncture to prevent reuse if drums are to be sent to a scrap metal reclaimer. Otherwise, undamaged drums can be sent to drum reconditioners who will process the drums for reuse, typically converting closed-head, 18-gauge to open-top drums. Dispose of rinsate in

accordance with applicable federal, state, and local regulations.

**CAUTION:** *Under no circumstance should empty drums be burned or cut open with an electric torch.*

TDI is listed as a hazardous waste under section 261.33(f) of EPA's RCRA regulations and requires special handling for disposal. Polyol drums can be sent to drum reconditioners or disposed of as ordinary industrial waste in compliance with pertinent regulations.

## **COMBUSTIBILITY**

During foaming operations and curing, foam temperatures may go above 140°C. To guard against the risk of spontaneous combustion resulting from exothermic heat retention, consult the supplier or product data sheet to determine the recommended thickness to be sprayed in a single application. Be sure all foam dispensing equipment is properly calibrated so that each component is applied within the ratio and tolerance specified by the material supplier. Smoking during pouring, frothing or spraying operations must be strictly prohibited. Avoid pouring, frothing or spraying activities near exposed lights, heating elements, open flame or while engaged in welding or similar "hot" activities. Fire suppression devices

should be readily available since flames can flash rapidly across the surface of foamed polyurethane, if ignited.

Polyurethane foams used as insulation require thermal protection from fire on the interior, such as one-half inch gypsum wallboard or the equivalent, unless fire testing demonstrates such thermal barriers are not needed. Consult the local building codes to determine applicable restrictions. Additionally, because polyurethane foams must generally be covered on the exterior with a coating or some other weather-resistant covering, applicators should follow the fire protection measures discussed above, or those provided by the supplier of the foam or covering material.

## **ADDITIONAL INFORMATION**

Additional information on properties and safe handling of polyurethane systems can be obtained from the following sources:

1. Technical Data Sheets and Materials Safety Data Sheets (OSHA Form 20, or equivalent) from the system supplier.
2. "Urethane Foams, Good Practices for Employees' Health and Safety," U.S. Dept. of HEW, National Institute for Occupational Safety and Health, Division of Technical Services, Cincinnati, Ohio.
3. "Recommendations for the Handling of Toluene Diisocyanate," 1980, International Isocyanate Institute, 119 Cherryhill Road, Parsippany, N.J. 07054.
4. "Recommendations for the Handling of 4,4' Diphenylmethane Diisocyanate MDI Monomeric and Polymeric," 1982, International Isocyanate Institute, 119 Cherryhill Road, Parsippany, N.J. 07054.
5. "Fire Safety Guidelines for Use of Rigid Polyurethane or Polyisocyanurate Foam Insulation in Building Construction," Polyurethane Division, The Society of the Plastics Industry, Inc., 355 Lexington Ave., New York, N.Y. 10017.
6. "Fire Safety Guidelines on Flexible Polyurethane Foams Used in Upholstered Furniture and Bedding," Polyurethane Division, The Society of the Plastics Industry, Inc., 355 Lexington Ave., New York, N.Y. 10017.
7. "Using Flexible Polyurethane Foams Safely" Polyurethane Division, The Society of the Plastics Industry, Inc., 355 Lexington Ave., New York, N.Y. 10017.

This bulletin is intended to primarily address occupational health and safety precautions that should be taken to protect workers during foaming operations. The information herein is offered in good faith and believed to be true, but is made WITHOUT WARRANTY, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER.



# URETHANE DIVISION BULLETIN

(U-111) March, 1980

## USING FLEXIBLE POLYURETHANE FOAMS SAFELY

### NOTE:

*The enclosed information is based on available data up to the date of this bulletin. Manufacturers should be consulted on changes in technology which may permit different applications from those recommended in these guidelines. In no case are these guidelines to be considered as superseding any specific government regulations or customer specifications.*

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## USING FLEXIBLE POLYURETHANE FOAMS SAFELY

### *Introduction*

In recent years, the production and uses of flexible polyurethane foams have expanded greatly. Because of their ease of fabrication, adaptability to styling, cleanliness and comfort, flexible polyurethane foams have become a dominant factor in providing cushioning for household products such as new and reupholstered furniture and bedding, often in combination with both natural and other synthetic materials. They are finding expanded uses in carpet cushioning, apparel and textiles, automobile padding, and in a number of industrial and other consumer products. The foams become component parts of the design and performance characteristics of the end products.

There are many different types of flexible polyurethane foams. They can be composed of various basic chemicals and additives, and they can be manufactured in a wide range of densities, all of which serve to provide a broad spectrum of properties. This aids in the selection of a foam specific to the needs of the end use.

All organic materials, both natural and synthetic, will burn if exposed to a sufficient heat source. Flexible polyurethane foams are organic materials and therefore will burn. When unmodified by combustion retardants, flexible foams are not normally prone to smoldering ignition. If ignited by an open flame, these foams, because of their low density open-celled structure, will burn more rapidly than denser materials, and some will produce a liquid "melt" which can cause downward propagation of flames.

By varying formulations and/or incorporating combustion retardant additives, the combustibility characteristics of flexible polyurethane foams can be altered to achieve varying degrees of resistance to ignition and spread of flame. But whether they contain combustion retardant additives or not, flexible polyurethane foams should be considered combustible.

The combustibility characteristics of a product containing flexible polyurethane foam, such as a piece of upholstered furniture, may be substantially different from the combustibility characteristics of the foam alone.

Selection of a foam specific to the needs of the end use, therefore, should take into account such factors as the type of ignition risk the product may be exposed to -- smoldering, small open flame, large open flame -- the fire risk characteristics of the occupancy in which it will be used, and the combustibility characteristics of other components of the product such as covering fabrics and interliners. Special foams designed for use in "high risk" areas are in various stages of development by a number of companies.

This booklet, based on fire research and experience, discusses uses of flexible polyurethane foams and considerations of their combustibility characteristics.

#### GENERAL USES OF FLEXIBLE POLYURETHANE FOAMS

To put the subject into perspective it is helpful to consider where and why flexible polyurethane foams are being used today.

- *Upholstered Furniture*

The largest market for flexible polyurethane foams is in furniture construction where they are used as cushioning under a variety of fabrics or coverings. Desired shapes can be cut easily from large production slabs. Their excellent molding characteristics also permit them to be made into very intricately shaped parts. The foams can be produced in soft grades for seating or in firm grades for chair arm rests, depending on desired properties.

- *Transportation*

The second largest market is in seating and padding construction for the transportation industry. For example, in 1970, approximately 19 pounds of foam were used in the average passenger car. By 1975, this had increased to 30 pounds per car. Semi-flexible foams are used as safety padding for instrument panels, head restraints, headliners, and arm rests, because of their low resiliency and high energy absorption properties. High resiliency (HR) foams have become the predominant type used in seating.

- *Bedding*

Flexible polyurethane foams in bedding construction offer luxurious comfort and support. They are light in weight and can be made to controlled degrees of firmness. They have excellent resistance to chemical and age deterioration, and are readily sterilized. Mattress cores may be molded from large production slabs or may be molded to obtain special characteristics. Flexible polyurethane foams sometimes are used in composite with other materials, such as innersprings.

- *Carpet Underlayment and Backing*

Flexible polyurethane foams are used both as separate carpeting underlayment and as foam-backing on carpets. They can be lighter than, but as effective as, competitive materials. They are odor-free, have good tensile strength, are resistant to deterioration from moisture and insects, tend to accumulate less dust, and serve as noise and thermal insulation barriers.

- *Apparel and Textiles*

Certain flexible polyurethane foams can be bonded or laminated to almost any fabrics. In the apparel industry, flexible polyurethane foams are used for bonding and bond insulation between fabrics and linings. These foam-bonded and foam-laminated fabrics are easy to work with, are comfortable and wrinkle-resistant, provide warmth without significant weight and retain their shape.

- *Industrial and Miscellaneous Uses*

In addition to their many domestic uses, flexible polyurethane foams have a large number of industrial and other applications. These include their use as pipe insulation, filters in air filtration systems, as sound absorption mediums, as gaskets and seals, in paint applicators, as packaging materials and as components of toys.

## OCCUPANCY CONSIDERATIONS

Where and how end products are to be used dictate different fire performance characteristics. Risks vary among various types of occupancies and even within certain occupancies.

The most common ignition sources of residential fires originating in bedding or furniture have been identified as cigarettes and other smoking materials. As a result, mattresses made in the United States must conform to Consumer Product Safety Commission Standard 16 CFR 1632 FF 4-72, a test in which lighted cigarettes are placed at key locations on the test mattress. While this test is deemed to provide consumer protection against ignition from such low intensity heat sources as smoldering cigarettes, it does not test resistance to open flame ignition nor predict the performance of mattresses once they become involved in actual fires. Any mattress comprising organic materials, natural or synthetic, will be consumed in a full-scale fire.

There is no comparable federal standard for furniture. However, the Consumer Product Safety Commission is considering a cigarette ignition standard and the Upholstered Furniture Action Council (UFAC) has established a program of voluntary construction standards designed to increase resistance to cigarette ignition.

In light of the fact that the polyurethane foams are such important components of these end products, the Urethane Division published, in 1977, a bulletin titled "Fire Safety Guidelines on Flexible Polyurethane Foams Used in Upholstered Furniture and Bedding," (U-106).

These guidelines, produced as a result of experience and fire testing, stated that design and testing of assemblies in which flexible polyurethane foams are used should take into account such factors as end uses (residential, commercial, transportation, places of public assembly, etc.) and fire protection measures employed (automatic detection and suppression, etc.).

Experience borne out by available statistical evidence indicates that combustibility performance standards for products in which flexible polyurethane foams or other combustible products are used should vary according to types of occupancies and certain other end use conditions.

For example, performance standards for products used in institutions and places of public assembly should be different than for products used in residences. Fires ignited by cigarettes or other smoking materials are the major concern regarding residential fire deaths. However, such factors as arson, limited mobility or limited means of exit may make open ignition of greater concern for institutional and public assembly usage.

Therefore, as an extension of the Fire Safety Guidelines, the Urethane Division of SPI established, in April 1979, the following positions concerning products in which flexible polyurethane foams are used:

#### *Residential Occupancies*

1. The federal standard 16 CFR 1632 FF 4-72 is an adequate test to determine resistance of a mattress to cigarette ignition, which has been determined to be the major cause of bedding fires. There is evidence that certain foams which pass the open flame ignition test required by California Bureau of Home Furnishings Bulletin 117 will provide mattresses with an additional degree of resistance to ignition by small open flames and cigarettes. However, flexible polyurethane foams, whether or not they contain flame retardants, may burn if subject to major open flame sources such as burning sheets and blankets.

2. The Urethane Division supports and encourages the efforts of the Upholstered Furniture Action Council in development of voluntary standards to cope with the problem of cigarette ignition which has been determined to be the major cause of furniture fires. In concert with the action of the Consumer Product Safety Commission, the Urethane Division reserves judgment on this program pending study. There is evidence that certain flexible polyurethane foams which pass the open flame ignition test required by California Bureau of Home Furnishings Bulletin 117 may provide an additional degree of resistance to ignition by small open flames and cigarettes. However, the ability of any piece of furniture to resist ignition will depend heavily on covering materials and construction methods used for the completed assembly.

3. All carpet installed in residential, commercial, and institutional occupancies in the United States is subject to the federal standard for the surface flammability of carpet and rugs 16 CFR 1630 FF 1-70 which specifies use of the methenamine pill test. It has been determined through room fire tests conducted by the National Bureau of Standards that carpet systems, including the underlayment, will not normally spread fire beyond the immediate vicinity of a burning object provided the carpet meets the requirements of FF 1-70. (Flame spread of carpet systems in room fires, NBSIR 76-1013, June 1976.) Care should be exercised not to expose flexible polyurethane foam underlayment to sources of ignition during the installation process.

#### *Private Automobiles*

4. The Department of Transportation open flame ignition test MVSS-302, which deals with the combustibility of interior furnishings of the automobile passenger compartment, generally recognizes that the systems can burn, but is concerned with establishment of a sufficiently low burning rate to allow egress time for vehicle occupants. The test's impact on death and/or injury rates due to interior automobile fires since its establishment in 1972 has not been determined. Continued support of enforcement of MVSS-302 is appropriate unless and until statistical evidence indicates otherwise.

#### *Institutions and Places of Public Assembly*

5. *Performance standards or guidelines for mattresses and furnishings used in institutional buildings such as hospitals and nursing homes should take into account the risk of accidental open flame ignition.*

6. *Performance standards or guidelines for mattresses and furnishings used in detention and correctional institutions such as jails, prisons and penitentiaries should take into account the risk of intentional open flame ignition, or arson.*

7. The Flooring Radiant Panel Test (NFPA Standard No. 253-1978; ASTM E-648) is appropriate for determining the ignition response of carpet and carpet assemblies (including flexible polyurethane foam backing) in exit/access corridors and enclosed exits of institutional and commercial buildings where these floor surfaces have been determined by the regulating authorities to be areas of unusual hazard. Care should be exercised not to expose flexible polyurethane foam underlayment to sources of ignition during the installation process.

8. *Performance standards or guidelines for furnishings* used in places of *public assembly* should take into account the fact that there may be a high density of population in relation to the number of exits, requiring measures to permit additional time for evacuation. Such standards should be more demanding than standards for residential uses.

#### *Mass Transportation*

9. *Performance standards or guidelines for materials used in mass transportation* should take into account that large numbers of people may be confined in a relatively small area with limited exits, requiring measures to permit additional time for evacuation, and that vandalism may be involved. Such standards should be more demanding than standards for private automobiles.

Member firms of the Urethane Division of The Society of the Plastics Industry, Inc. (SPI) are continually working to improve the combustibility characteristics of their products. The Urethane Division of SPI stands ready to work with appropriate government and industry groups in the development of performance standards or guidelines as they apply to products containing flexible polyurethane foams.

#### PRODUCT DESIGN AND ROLE OF COVERING MATERIALS

In evaluating the combustibility performances of flexible polyurethane foams, it is important to view the foams as components of end products, rather than just examining the characteristics of the foams alone.

Flexible polyurethane foams used in furniture and bedding constructions always require covering materials. The porous cellular surface of the foams can harbor dust which can increase their vulnerability to fire. Second, flexible polyurethane foams do not have abrasive-resistant surfaces to stand up to direct wear and tear. And, foams that are not covered will discolor relatively quickly in direct sunlight.

The weight and composition of covering materials can affect the resistance to ignition of the final assembled product, such as an upholstered cushion or mattress. There are two basic types of combustion, flaming and smoldering, and they are significantly different. Flaming combustion is the thermal oxidation of volatile gases such as illustrated by a burning match. Smoldering combustion is the thermal oxidation of solids, as illustrated by a burning cigarette. Tests have shown that when exposed to an open flame, wool as a covering material ignites only with difficulty, while cotton/acrylic combinations and thermoplastics can ignite relatively easily. Some cotton fabrics above 12 oz./yd. in weight will sustain smoldering, leading to delayed ignition of the product, while thermoplastic coverings will not smolder. This factor is significant because most fire fatalities result from smoldering type ignitions. When smoldering fabric coverings or welt cords provide high heat fluxes on foam cushioning, they will cause smoldering destruction of the foams. Hence, the covering material is the first line of defense against smoldering ignition from cigarettes in furniture construction.

The contamination of the covering materials also can affect its resistance to ignition. Household dust, cigarette ash, sugar or alcohol from spilled drinks, can have a "wicking" effect in transferring a fuel to the heat source, thus promoting further burning. Also, the application of wax polishes to coated fabric or plastic covers may make them more easily ignitable. Fabric and vinyl covers that are worn thin, scuffed, or torn, will reduce the resistance of upholstered furniture to catching fire if subjected to a heat source of sufficient intensity.

Large scale tests conducted by the British Rubber and Plastics Research Association (RAPRA) and the U.S. plastics industry have shown that selection of the covering materials and the design of the finished assembly are important considerations in the combustibility behavior of upholstered furniture. The tests showed that, when evaluated with potential risks, some assemblies might benefit from use of an interliner between foam and covering fabric. Such construction can help increase resistance to ignition and, if ignited, tend to reduce burning rate and generation of gases.

## IGNITION TEMPERATURE AND FLAME SPREAD CHARACTERISTICS OF FLEXIBLE POLYURETHANE FOAMS

Although the combustion characteristics of flexible polyurethane foams, and the products in which they are used, can be altered by changing formulations and/or by including flame retardants and other additives in production, at the present stage of development, all urethane foams should be considered combustible under certain conditions and handled accordingly. Therefore, a brief review of the performance of urethane foams during the major steps of a "standard" fire scenario may be helpful.

Ignition performance traditionally has been evaluated by a series of small scale tests by the military, government agencies, the American Society for Testing and Materials (ASTM) and others. These tests, however, are not necessarily predictive of combustibility performance in actual fire situations. The behavior of any materials when exposed to measured heat sources in conditions of differing air movements or ventilation systems, humidity, occupancy, other component materials, etc., can be very different.

Ignition test results for flexible polyurethane foam can vary depending on chemical formulations, foam density, composition of materials, and the intensity of the heat source involved. Low density flexible foam with no flame retardant additives or fire protective covering material conceivably could ignite with even a relatively low flaming energy source. Higher density foams with flame retardant additives significantly reduce ease of ignition.

The ignition temperature of flexible polyurethane foam is in the range of 375-475° C. The temperature must exceed 150° C. for a period of time before the occurrence of degradation, which may lead eventually to self-ignition. At this temperature most solid combustible material will exhibit signs of charring, one of the first steps in ignition.

The British Rubber Manufacturers' Association (BRMA) and others have found that flexible polyurethane foam can be exposed indefinitely to temperatures up to 105° C. without suffering any thermal degradation which could lead to the risk of fire. By comparison, the human skin can stand up to 60° C. before experiencing unendurable pain.

Thermal degradation depends on the temperature and the duration of exposure to that temperature. At 140° C., a temperature which will kill human beings, continuous exposure for about one month (over 700 hours) would be required to cause decomposition in flexible polyurethane foam which could lead to self-ignition.



When ignited by open flame, burning flexible polyurethane foams will develop highly localized temperature buildup relatively quickly for shorter periods of time compared with more dense materials such as wood, due to surface heat diffusivity. Tests by the BRMA and National Bureau of Standards have shown that ceiling temperatures recorded above a burning upholstered chair containing urethane foam ranged from 200 to 600°C., but only for a duration of from two to three minutes. Such time/temperature duration cycles normally would be insufficient to cause ceiling joists above to become ignited. However, most burning flexible polyurethane foams have a tendency to "flow" -- depending on their composition -- and can fuel a fire beneath or cause downward transference of ignition.

Many synthetic materials, flexible polyurethane foam being one, are not prone to smoldering unless in contact with severely smoldering fabrics, whereas most cellulosic materials, such as cotton or wood, will readily sustain smoldering combustion. Smoldering may lead to flaming after a considerable lapse of time following the initial ignition, (e.g. 1-2 hours).

#### MAJOR COMBUSTION PRODUCTS OF FLEXIBLE POLYURETHANE FOAM FIRES

Burning flexible foam usually produces smoke, a brown liquid "melt" which may continue burning after the heat source has been removed, and various gases. The most significant gas, in terms of life safety, is carbon monoxide, as with almost all burning organic materials, natural and synthetic.

##### *Smoke*

In the early stages of a fire, a limited amount of smoke can give a visible warning that something is wrong. However, a large volume of dense smoke presents a major hazard in that it can cause panic and disorientation and inhibit ability to escape. In addition, it causes people to choke and thus inhale larger quantities of toxic gases which will be present in the smoke. Suspended particles of matter produced by the burning is less likely to bring about death than asphyxiation (lack of oxygen), exposure to toxic gases, or intense heat.

BRMA conducted tests on burning upholstered furniture which included measurement of the time taken for smoke generation to reach dangerous levels in which victims might be trapped by smoke, cutting off an escape route. The period has been termed the "escape time" and is based on visibility limits determined by the Home Office Fire Inspectorate. An interior area is defined as "smoke logged" when visibility is reduced to 4.5 meters (14.8 feet).

The tests disclosed that the room escape time for flame-ignited chairs filled with polyurethane foams with a covering material was of a very similar order to those for chairs containing traditional material fillings. In completely closed rooms with no ventilation, smoke logging is likely to occur within one-half to eight minutes whether the chairs consisted of traditional or man-made materials. Under smoldering ignition conditions, which usually involve only traditional materials (plastics usually do not propagate fire by smoldering), smoke buildup takes considerably longer and escape time may be in the range of 20 to 70 minutes. However, this time lapse can be a hazard if it does not give sufficient warning of an incipient fire.

### *Toxic Gases*

Until relatively recently, little detailed knowledge existed regarding the products of combustion of many natural materials widely used in the home. It is hardly surprising, therefore, that little was known about the combustion products given off by the newer man-made products. A number of research projects on the issue have been undertaken in the United States and Europe in recent years. Although much of the research is yet to be completed or published, some facts about these combustion products are known.

As of the time of printing of this booklet the National Bureau of Standards has stated that no standard test methodology is available to evaluate hazards presented by the toxic off-gases of real fires. However, NBS and other organizations are attempting to establish test methods designed to screen out potentially high hazard materials. Certain gases from burning polyurethanes and other common materials used in construction and furnishings are known. Their concentrations are highly dependent on the type of fire (flaming or smoldering) as well as the material involved.

### *Carbon Monoxide*

Like most other plastics and natural materials, flexible polyurethane foams are carbon-based substances and, when burned, release carbon monoxide, a colorless and odorless gas. This is the most significant gas released in any fire atmosphere and is generally accepted as being the cause of the majority of deaths among victims from fire.

Pound for pound, burning cellulose, such as cotton, and flexible polyurethane foams will release about the same total amount of carbon monoxide. Because the weight-to-volume ratio is lower for foams, the release rate may be greater but the total amount of carbon monoxide released by foams in a real fire situation may be no greater, and could well be less.

### *Carbon Dioxide*

Carbon dioxide is produced when most organic materials are burned although the quantity will depend on such factors as the amount of moisture and oxygen. While non-toxic, carbon dioxide can cause asphyxiation due to depletion of oxygen. High concentrations also can increase the respiration rate which may lead to increased inhalation of other gases.

### *Nitrogen Oxide*

Burning flexible polyurethane foam will release about the same amount of nitrogen oxides as the same quantity of wool, leather and nylon. However, the latter materials tend to release more nitrogen oxides at lower (600-700 C.) and higher (900-1,000 C.) temperature ranges, while flexible polyurethane foams release it at a more constant rate across the whole temperature spectrum.

### *Hydrogen Cyanide*

Any organic material containing nitrogen will release hydrogen cyanide when burned under certain conditions. Wool, nylon and acrylics will generate several times more hydrogen cyanide than will the same weight of flexible polyurethane foams.

In fire tests sponsored by producers of component materials in the United States and the United Kingdom, hydrogen cyanide was generally not found to be a major hazard as a result of burning polyurethane foam.

Although test procedures to measure hydrogen cyanide still are under examination, the current consensus is that carbon monoxide and heat in actual fires probably will endanger human life before the hydrogen cyanide reaches hazardous levels.

### *Isocyanates*

When flexible polyurethane foam burns, it can release very small quantities of isocyanates, a chemical used in the manufacture of the foam.

In a typical flexible polyether urethane foam, about 25 to 40 percent of the weight of the foam is contributed by the TDI (toluene di-isocyanate). However, test work has shown that when subjected to sufficient heat, such as a fire situation, a

maximum of only one percent of the weight of the polyurethane foam is likely to be evolved as bound isocyanate. Within that small percentage, very low levels of free TDI are likely to be evolved from fire.

The release of isocyanates is likely to occur in the early lower temperature stages of a fire. Experimental evidence to date indicates that as the temperature develops rapidly in a fire, the traces of isocyanates react with other combustion intermediates forming products which are likely to be stable up to much higher temperatures, and at this stage they could very likely react further to form relatively harmless gases such as carbon dioxide.

#### *Other Gases*

The introduction of compounds containing bromines or chlorines, or other chemicals, into flexible polyurethane foams to inhibit ignition and flame spread probably lead to production of hydrogen chloride and hydrogen bromide if these products become involved in full-scale fires. The present consensus is that the presence of hydrogen chloride and hydrogen bromide, while increasing the irritancy of smoke, would play only secondary roles, while carbon monoxide and heat will be the overriding life-safety risk. However, further examination of these gases is called for.

### COMBUSTIBILITY STANDARDS, REGULATIONS AND TESTS

#### *Standards and Regulations*

As stated earlier, all mattresses sold in the United States are required to conform to Consumer Product Safety Commission Standard 1632 CFR FF4-72, "Flammability Standard for Mattresses."

At present, there are no federal standards governing the combustibility of upholstered furniture, although various proposals are under consideration at the Consumer Product Safety Commission.

Where no comparable federal standards exist, states are permitted to establish their own combustibility standards and regulations. The State of California Bureau of Home Furnishings has established an open flame test for components of upholstered furniture (Bulletin 117). In addition, a number of federal and state agencies have set combustibility standards and specifications for materials and products they purchase.

### *Combustibility Tests*

In the fire testing of products, it is important to determine the combustibility behavior of the completed assembly. It is generally recognized that evaluating combustibility characteristics of the composites is much more complicated than examining the individual components because of the interactions of the great variety of combinations of padding and covering materials and configurations involved.

Small-scale laboratory tests have a function in identifying combustibility characteristics of materials. They should not be used to predict the behavior of an assembly in real fire situations unless a definite correlation between the test procedure and actual fire situations has been established on the basis of large-scale tests.

Fire tests sponsored by the producers of component materials have been conducted in the United States and in the United Kingdom. In general, these tests showed that the combustibility characteristics of an upholstered assembly varies according to types of coverings, configuration of the final assembly, formulation of the foam, and flame retardant additives.

More specifically the tests indicated:

1. Combustibility behavior of upholstered furniture is extremely varied and often depends more on the covering fabric than on the filling materials.
2. In a comparison of upholstery filling materials, it was found that natural and SBR latex foam rubber tested burned faster and more intensely than polyurethane foam, which itself is consumed more rapidly than rubberized hair or wool flock. Foams containing flame retardant additives, and high resilient (HR) foams, generally are more difficult to ignite with a small ignition source.
3. When exposed to a small open flame, wool as a covering material ignites only with difficulty while cotton/acrylic combinations ignite relatively quickly. Polyurethane foam cushions with thermoplastic coverings displayed fire behavior similar to uncovered foam when the temperature of the ignition source was high enough to ignite or melt the covering. A covering of polyurethane/cotton fabric displayed the greatest fire retardation of those tested.
4. Using cigarettes as the ignition source did not result in ignition in either the thermoplastic covered or

uncovered polyurethane foam. When covered by a limited number of other fabrics, those foams containing flame retardant additives and the high resilient foams were superior in resistance to ignition compared to conventional polyurethane. However, with heavy density cellulosic fabrics, smoldering occurred which ultimately ignited the foam chair.

5. The use of certain interliners between covering and filling materials significantly increases resistance to ignition and, if ignited, tends to reduce the spread of flame.
6. Carbon monoxide was the most significant toxicant gas measured for all materials tested with the exception of the polyurethane foam containing no flame retardant additives. With the latter material, nitrogen oxides were more significant. Hydrogen cyanide was generally not found to be a major hazard as a result of burning polyurethane foam.

#### *Additional Testing Needed*

A great deal of work already has been done to understand and improve the combustibility performance of urethane foams, and small-scale fire tests of various materials have provided much useful information. Large-scale full room tests have shown that by using information generated in small-scale tests concerning fabrics, foam types, interliners and welting cords, furniture can be designed which will perform better in real fire environments than more conventional products. Further testing may be required to help in the development of combustibility codes and standards.

#### FLEXIBLE POLYURETHANE FOAMS AND SAFETY

A review of possible sources of fire accidents in the home should be helpful to an understanding of the safe use of products containing flexible polyurethane foams or any other combustible materials. Following are some typical examples:

*Open Flames.* Flames from gas stoves, gas heaters, oil heaters or open fires present a danger but often they are in a fixed position and protected by safety guards. Matches and cigarette lighters, while they are much smaller flame sources, are not in fixed positions and should be handled carefully.

*Smokers' Materials.* Cigarettes, cigars and pipes are the ignition source for most upholstery and bedding fires. Every precaution should be taken to check that no lighted smoking materials have been left burning where they might ignite combustible products.

*Radiant Heaters.* Radiant heaters and fireplaces, if located too close to furniture or beds, can cause fires. If mattresses or cushions become wet they should not be dried in front of an unattended radiant heater or open flame.

*Electric Light Bulbs.* Electric light bulbs can become very hot when they are switched on and the surface is not ventilated. Care should be taken to see that table or bedside lamps cannot be easily knocked over onto pillows, cushions or bedding. The folds of bedding and cushions can contain the surface heat of the bulb which could lead to a fire.

*Spontaneous Combustion.* There are no known problems of spontaneous combustion of flexible polyurethane foam in the home. This can only occur during the manufacturing process when in producing the cellular structure and curing the foam temperatures may go above 140°C. Even in the manufacturing process, however, spontaneous combustion is very uncommon, resulting from improper formulation, fabricating or storage techniques.

*Safe Uses in the Home.* Electric blankets are safe to use on polyurethane foam-filled mattresses provided they are used in accordance with the blanket manufacturers' instructions. Hot water and underfloor radiant heating systems do not become hot enough to present any fire risk. Sunlight ordinarily will not generate temperatures sufficiently high to ignite polyurethane foam in furniture or bedding unless magnified through a lens-shaped item.

*Extinguishing Polyurethane Foam Fires.* In burn test programs conducted by the BRMA no problems were experienced in extinguishing polyurethane foam fires. Water was found to be an efficient extinguishing agent for these fires. Soaking should be sufficient to prevent re-ignition.

#### *Handling and Storing Flexible Polyurethane Foams*

In its industrial uses, flexible polyurethane foam is likely to be uncovered and, when used as a process stock, stored in relatively large amounts in stores or working areas. This can present a potential fire hazard. Once ignited, these foams may melt to form flammable liquids which may spread flames rapidly and produce intense heat, dense smoke and toxic gases.

To protect against serious fires developing, raw foam and fabricated items should be stored indoors, away from fabricating operations, and be protected by automatic sprinklers. A bulletin issued by

The Factory Mutual System, "Storage of Flexible Polyurethane" (8-17S), provides recommendations on height of foam piles and sprinkler installation.

Ignition sources such as smoking materials, exposed lights, open flames and exposed heating elements should be kept away from storage and fabricating areas. Scrap foam should not be permitted to accumulate but should be disposed of promptly. Access aisles should be maintained between foam piles.

Should a fire break out, the burning foam should be drenched with copious amounts of water from a fire hose with a spray nozzle. Fire fighters should use self-contained breathing apparatus, as in all fires.

In addition to these specific suggestions, general fire safety recommendations that apply to other combustible materials also apply to the storage of flexible polyurethane foam.

#### References

1. "Urethane Plastics: A Status Report," Urethane Safety Group, The Society of the Plastics Industry, Inc., November 1974.
2. "Fire Safety Guidelines on Flexible Polyurethane Foams Used in Upholstered Furniture and Bedding," SPI Urethane Safety Group Bulletin (U106), The Society of the Plastics Industry, Inc., May 1977.
3. "Facts and Figures of the Plastics Industry -- 1977 Edition," The Society of the Plastics Industry, Inc., September 1977.
4. "Fifty Questions on Flexible Polyurethane Foam," British Rubber Manufacturers' Association.
5. "Flexible Polyurethane Foam: Its Uses and Misuses," British Rubber Manufacturers' Association.



# PART A EMPLOYMENT AND POTENTIAL EXPOSURE PROFILE

9.01 Mark (X) the appropriate column to indicate whether your company maintains records on the following data elements for hourly and salaried workers. Specify for each data element the year in which you began maintaining records and the number of years the records for that data element are maintained. (Refer to the instructions for further explanation and an example.)

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Data Element	Data are Maintained for:		Year in Which Data Collection Began	Number of Years Records Are Maintained
	Hourly Workers	Salaried Workers		
Date of hire	<u>X</u>	<u>X</u>	<u>1970</u>	<u>INDEFINITELY</u>
Age at hire	<u>X</u>	<u>X</u>	<u>1970</u>	<u>INDEFINITELY</u>
Work history of individual before employment at your facility	<u>X</u>	<u>X</u>	<u>UK</u>	<u>INDEFINITELY</u>
Sex	<u>X</u>	<u>X</u>	<u>1970</u>	<u>INDEFINITELY</u>
Race	<u>X</u>	<u>X</u>	<u>1970</u>	<u>INDEFINITELY</u>
Job titles	<u>X</u>	<u>X</u>	<u>1970</u>	<u>INDEFINITELY</u>
Start date for each job title	<u>X</u>	<u>NA</u>	<u>1970</u>	<u>INDEFINITELY</u>
End date for each job title	<u>X</u>	<u>X</u>	<u>UK</u>	<u>INDEFINITELY</u>
Work area industrial hygiene monitoring data	<u>X</u>	<u>X</u>	<u>1973</u>	<u>30</u>
Personal employee monitoring data	<u>X</u>	<u>NA</u>	<u>1973</u>	<u>30</u>
Employee medical history	<u>X</u>	<u>X</u>	<u>1978</u>	<u>30</u>
Employee smoking history	<u>X</u>	<u>X</u>	<u>1978</u>	<u>INDEFINITELY</u>
Accident history	<u>X</u>	<u>X</u>	<u>1965</u>	<u>INDEFINITELY</u>
Retirement date	<u>X</u>	<u>X</u>	<u>1970</u>	<u>INDEFINITELY</u>
Termination date	<u>X</u>	<u>X</u>	<u>1970</u>	<u>INDEFINITELY</u>
Vital status of retirees	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
Cause of death data	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

☐ Mark (X) this box if you attach a continuation sheet.

9.02 In accordance with the instructions, complete the following table for each activity in which you engage.

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a.	b.	c.	d.	e.
<u>Activity</u>	<u>Process Category</u>	<u>Yearly Quantity (kg)</u>	<u>Total Workers</u>	<u>Total Worker-Hours</u>
Manufacture of the listed substance	Enclosed	N/A		
	Controlled Release	N/A		
	Open	N/A		
On-site use as reactant	Enclosed	0	0	
	Controlled Release	142,083	6	2000
	Open	0	0	
On-site use as nonreactant	Enclosed	N/A		
	Controlled Release	N/A		
	Open	N/A		
On-site preparation of products	Enclosed	N/A		
	Controlled Release	N/A		
	Open	N/A		

☐ Mark (X) this box if you attach a continuation sheet.

9.03 Provide a descriptive job title for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance.

CBI

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Labor Category

Descriptive Job Title

A

FOREMAN

B

CHEMICAL OPERATOR

C

SHIPPING/RECEIVING LABORER

D

LABORATORY TECHNICIAN

E

F

G

H

I

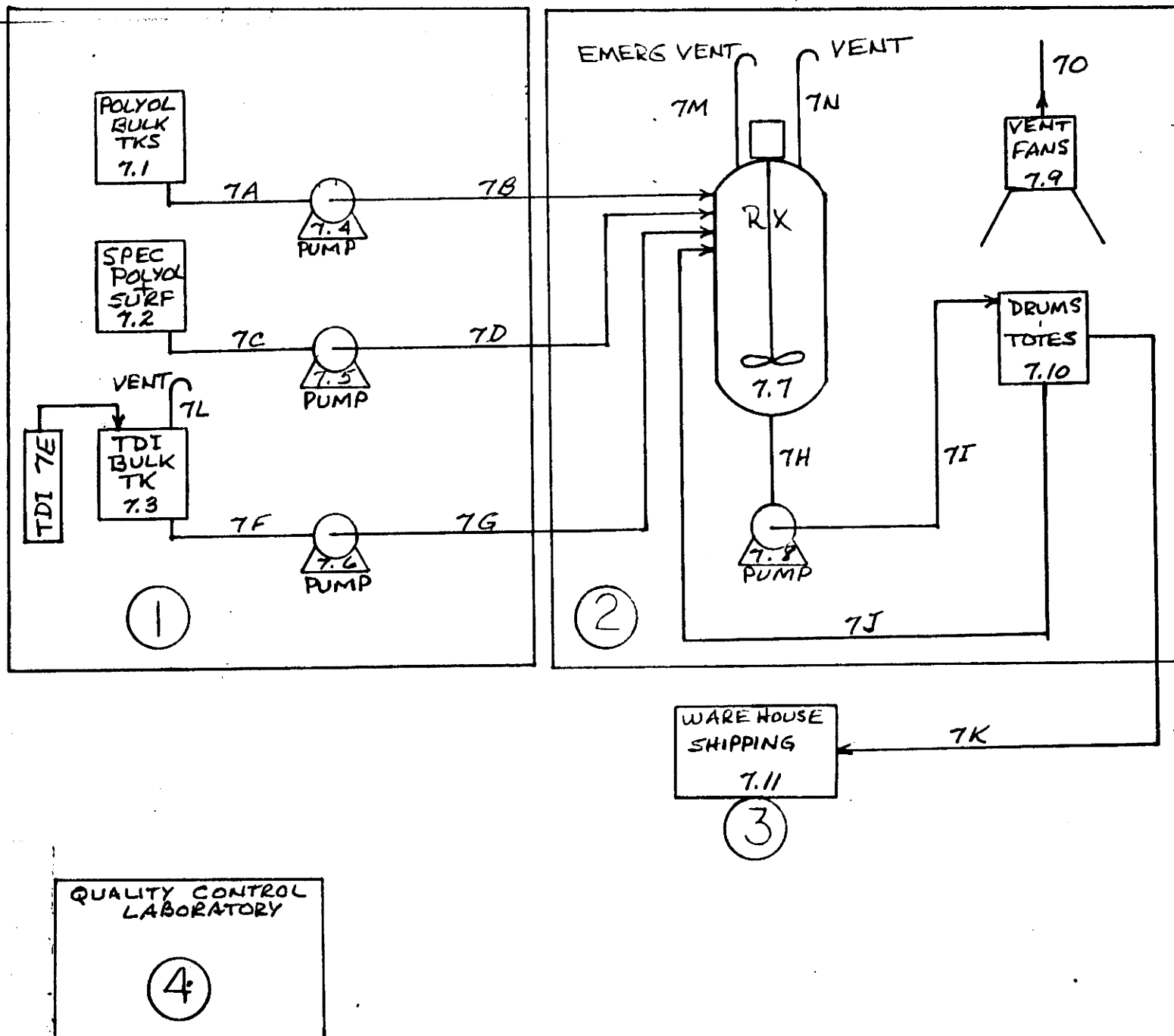
J

☐ Mark (X) this box if you attach a continuation sheet.

9.04 In accordance with the instructions, provide your process block flow diagram(s) and indicate associated work areas.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS



☐ Mark (X) this box if you attach a continuation sheet.

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### Description of Work Areas and Worker Activities

- 1 Bulk receiving/Storage (Workers unload tank wagons)
- 2 Reactor, drumming area (Worker operates equipment)
- 3 Warehouse/Shipping (Workers load drums into trucks)
- 4 Control lab (Technician checks product quality)
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_
- 7 \_\_\_\_\_
- 8 \_\_\_\_\_
- 9 \_\_\_\_\_
- 10 \_\_\_\_\_

[ ]

9.06. Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question and complete it separately for each process type and work area.

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 1

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance <sup>1</sup>	Average Length of Exposure Per Day <sup>2</sup>	Number of Days per Year Exposed
A,C	2	SKIN CONTACT	OL	B	10
A,C	2	INHALATION	GU	B	10

<sup>1</sup>Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensable at ambient temperature and pressure)	SY = Sludge or slurry
GU = Gas (uncondensable at ambient temperature and pressure; includes fumes, vapors, etc.)	AL = Aqueous liquid
SO = Solid	OL = Organic liquid
	IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

<sup>2</sup>Use the following codes to designate average length of exposure per day:

A = 15 minutes or less	D = Greater than 2 hours, but not exceeding 4 hours
B = Greater than 15 minutes, but not exceeding 1 hour	E = Greater than 4 hours, but not exceeding 8 hours
C = Greater than one hour, but not exceeding 2 hours	F = Greater than 8 hours

☐ Mark (X) this box if you attach a continuation sheet.

9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question and complete it separately for each process type and work area.

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 2

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance <sup>1</sup>	Average Length of Exposure Per Day <sup>2</sup>	Number of Days per Year Exposed
A,B	2	SKIN CONTACT	OL	D	100
A,B	2	INHALATION	GU	D	100

<sup>1</sup>Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensable at ambient temperature and pressure)  
 GU = Gas (uncondensable at ambient temperature and pressure; includes fumes, vapors, etc.)  
 SO = Solid

SY = Sludge or slurry  
 AL = Aqueous liquid  
 OL = Organic liquid  
 IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

<sup>2</sup>Use the following codes to designate average length of exposure per day:

A = 15 minutes or less  
 B = Greater than 15 minutes, but not exceeding 1 hour  
 C = Greater than one hour, but not exceeding 2 hours

D = Greater than 2 hours, but not exceeding 4 hours  
 E = Greater than 4 hours, but not exceeding 8 hours  
 F = Greater than 8 hours

☐ Mark (X) this box if you attach a continuation sheet.

9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 3

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance <sup>1</sup>	Average Length of Exposure Per Day <sup>2</sup>	Number of Days per Year Exposed
A,C	2	SKIN CONTACT	OL	A	30
A,C	2	INHALATION	GU	A	30

<sup>1</sup>Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensable at ambient temperature and pressure)  
 GU = Gas (uncondensable at ambient temperature and pressure; includes fumes, vapors, etc.)  
 SO = Solid

SY = Sludge or slurry  
 AL = Aqueous liquid  
 OL = Organic liquid  
 IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

<sup>2</sup>Use the following codes to designate average length of exposure per day:

A = 15 minutes or less  
 B = Greater than 15 minutes, but not exceeding 1 hour  
 C = Greater than one hour, but not exceeding 2 hours

D = Greater than 2 hours, but not exceeding 4 hours  
 E = Greater than 4 hours, but not exceeding 8 hours  
 F = Greater than 8 hours

☐ Mark (X) this box if you attach a continuation sheet.



9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 4

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance <sup>1</sup>	Average Length of Exposure Per Day <sup>2</sup>	Number of Days per Year Exposed
D	1	SKIN CONTACT	OL	C	100
D	1	INHALATION	GU	C	100

<sup>1</sup>Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensable at ambient temperature and pressure)  
 GU = Gas (uncondensable at ambient temperature and pressure; includes fumes, vapors, etc.)  
 SO = Solid

SY = Sludge or slurry  
 AL = Aqueous liquid  
 OL = Organic liquid  
 IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

<sup>2</sup>Use the following codes to designate average length of exposure per day:

A = 15 minutes or less  
 B = Greater than 15 minutes, but not exceeding 1 hour  
 C = Greater than one hour, but not exceeding 2 hours

D = Greater than 2 hours, but not exceeding 4 hours  
 E = Greater than 4 hours, but not exceeding 8 hours  
 F = Greater than 8 hours

☐ Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 1

Labor Category	8-hour TWA Exposure Level (ppm, mg/m <sup>3</sup> , other-specify)	15-Minute Peak Exposure Level (ppm, mg/m <sup>3</sup> , other-specify)
A	NA	NA
C	NA	NA

☐ Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 2

<u>Labor Category</u>	<u>8-hour TWA Exposure Level (ppm, mg/m<sup>3</sup>, other-specify)</u>	<u>15-Minute Peak Exposure Level (ppm, mg/m<sup>3</sup>, other-specify)</u>
A	LESS THAN 1 ppb	LESS THAN 5 ppb
B	LESS THAN 1 ppb	LESS THAN 5 ppb

☐ Mark (X) this box if you attach a continuation sheet.

**CBI**



3

☐ Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 4

<u>Labor Category</u>	<u>8-hour TWA Exposure Level (ppm, mg/m<sup>3</sup>, other-specify)</u>	<u>15-Minute Peak Exposure Level (ppm, mg/m<sup>3</sup>, other-specify)</u>
D	NA	LESS THAN 7 ppb

☐ Mark (X) this box if you attach a continuation sheet.

**PART B WORK PLACE MONITORING PROGRAM**

9.08 If you monitor worker exposure to the listed substance, complete the following table.

CBI

☐

<u>Sample/Test</u>	<u>Work Area ID</u>	<u>Testing Frequency (per year)</u>	<u>Number of Samples (per test)</u>	<u>Who Samples<sup>1</sup></u>	<u>Analyzed In-House (Y/N)</u>	<u>Number of Years Records Maintained</u>
Personal breathing zone	2,4	1	1	A	Y	30
General work area (air)	1,2	CONTINUOUSLY	NA	A	Y	30
Wipe samples	NA	NA	NA	NA	NA	NA
Adhesive patches	NA	NA	NA	NA	NA	NA
Blood samples	1-4	1	UK	D	N	30
Urine samples	1-4	1	UK	D	N	30
Respiratory samples	NA	NA	NA	NA	NA	NA
Allergy tests	1-4	1	UK	D	N	30
Other (specify)						
COMPLETED PHYSICAL	1-4	1	1	D	N	30
Other (specify)						
PULMONARY FUNCTION	1-4	1	3	D	N	30
Other (specify)						

<sup>1</sup>Use the following codes to designate who takes the monitoring samples:

A = Plant industrial hygienist

B = Insurance carrier

C = OSHA consultant

D = Other (specify) COMPANY DOCTOR

☐ Mark (X) this box if you attach a continuation sheet.

9.09 For each sample type identified in question 9.08, describe the type of sampling and analytical methodology used for each type of sample.

☐ Sample Type Sampling and Analytical Methodology

<u>PERSONAL ZONE</u>	<u>COLORIMETRIC TAPE/AIR PUMP</u>
<u>GENERAL AREA (AIR)</u>	<u>CONTINUOUS RECORDING, COLORIMETRIC TAPE</u>
<u>BLOOD, URINE</u>	<u>MOBILE MEDICAL LABORATORY COLLECTS</u>
<u>ALLERGY, PFT</u>	<u>AND ANALYZES AT THE DIRECTION OF THE</u>
<u>X-RAY</u>	<u>COMPANY MEDICAL DOCTOR</u>

9.10 If you conduct personal and/or ambient air monitoring for the listed substance, specify the following information for each equipment type used.

CBI

<input type="checkbox"/> <u>Equipment Type</u> <sup>1</sup>	<u>Detection Limit</u> <sup>2</sup>	<u>Manufacturer</u>	<u>Averaging Time (hr)</u>	<u>Model Number</u>
<u>D</u>	<u>0.001A</u>	<u>GMD SYSTEMS</u>	<u>0.08</u>	<u>800-50</u>
<u>H</u>	<u>0.001A</u>	<u>MDA SCIENTIFIC</u>	<u>8(VARIABLE)</u>	<u>7005</u>
<u>H</u>	<u>0.001A</u>	<u>MDA SCIENTIFIC</u>	<u>8(VARIABLE)</u>	<u>7100</u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

<sup>1</sup>Use the following codes to designate personal air monitoring equipment types:

- A = Passive dosimeter
- B = Detector tube
- C = Charcoal filtration tube with pump
- D = Other (specify) COLORIMETRIC PAPER TAPE

Use the following codes to designate ambient air monitoring equipment types:

- E = Stationary monitors located within work area
- F = Stationary monitors located within facility
- G = Stationary monitors located at plant boundary
- H = Mobile monitoring equipment (specify) COLORIMETRIC TAPE
- I = Other (specify)

<sup>2</sup>Use the following codes to designate detection limit units:

- A = ppm
- B = Fibers/cubic centimeter (f/cc)
- C = Micrograms/cubic meter (µ/m<sup>3</sup>)

☐ Mark (X) this box if you attach a continuation sheet.

9.11 If you conduct routine medical tests for monitoring the health effects of exposure to the listed substance, specify the type and frequency of the tests.

CBI

☐

Test Description

Frequency  
(weekly, monthly, yearly, etc.)

PULMONARY FUNCTION TEST

YEARLY

CHEST X-RAY

YEARLY

ALLERGY SENSITIVITY - BLOOD

YEARLY

☐ Mark (X) this box if you attach a continuation sheet.



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**PART C ENGINEERING CONTROLS**

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9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 1

<u>Engineering Controls</u>	<u>Used (Y/N)</u>	<u>Year Installed</u>	<u>Upgraded (Y/N)</u>	<u>Year Upgraded</u>
<b>Ventilation:</b>				
Local exhaust	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
General dilution	<u>Y</u>	<u>1985</u>	<u>N</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Vessel emission controls	<u>N</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Mechanical loading or packaging equipment	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

RELOCATED EQUIPMENT TO NEW BUILDING IN 1985.

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☐ Mark (X) this box if you attach a continuation sheet.

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**PART C ENGINEERING CONTROLS**

**9.12** Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ **Process type** ..... TDI PREPOLYMER MANUFACTURING PROCESS

**Work area** ..... 2

<u>Engineering Controls</u>	<u>Used (Y/N)</u>	<u>Year Installed</u>	<u>Upgraded (Y/N)</u>	<u>Year Upgraded</u>
<b>Ventilation:</b>				
Local exhaust	<u>Y</u>	<u>1985</u>	<u>N</u>	<u>N/A</u>
General dilution	<u>Y</u>	<u>1985</u>	<u>N/A</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Vessel emission controls	<u>N</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Mechanical loading or packaging equipment	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

RELOCATED EQUIPMENT TO NEW BUILDING IN 1985.

☐ **Mark (X) this box if you attach a continuation sheet.**

**PART C ENGINEERING CONTROLS**

9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 3

<u>Engineering Controls</u>	<u>Used (Y/N)</u>	<u>Year Installed</u>	<u>Upgraded (Y/N)</u>	<u>Year Upgraded</u>
<b>Ventilation:</b>				
Local exhaust	<u>N</u>	<u>N/A</u>	<u>N</u>	<u>N/A</u>
General dilution	<u>Y</u>	<u>1985</u>	<u>N/A</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Vessel emission controls	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Mechanical loading or packaging equipment	<u>Y</u>	<u>1985</u>	<u>N</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

RELOCATED EQUIPMENT TO NEW BUILDING IN 1985.

☐ Mark (X) this box if you attach a continuation sheet.

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**PART C ENGINEERING CONTROLS**

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9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 4

<u>Engineering Controls</u>	<u>Used (Y/N)</u>	<u>Year Installed</u>	<u>Upgraded (Y/N)</u>	<u>Year Upgraded</u>
<b>Ventilation:</b>				
Local exhaust	<u>Y</u>	<u>1985</u>	<u>N</u>	<u>N/A</u>
General dilution	<u>Y</u>	<u>1985</u>	<u>N</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Vessel emission controls	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Mechanical loading or packaging equipment	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other (specify) _____	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

RELOCATED EQUIPMENT TO NEW BUILDING IN 1985.

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☐ Mark (X) this box if you attach a continuation sheet.

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9.13 Describe all equipment or process modifications you have made within the 3 years prior to the reporting year that have resulted in a reduction of worker exposure to the listed substance. For each equipment or process modification described, state the percentage reduction in exposure that resulted. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... ALL 1-4

<u>Equipment or Process Modification</u>	<u>Reduction in Worker Exposure Per Year (%)</u>
All equipment relocated into new building in 1985. More	10-20%
efficient use of existing equipment, improved physical	
arrangement and better use of ventiation methods	
developed in preceeding years. Closed bulk system to transfer	

TDI

☐ Mark (X) this box if you attach a continuation sheet.

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**PART D PERSONAL PROTECTIVE AND SAFETY EQUIPMENT**

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9.14 Describe the personal protective and safety equipment that your workers wear or use in each work area in order to reduce or eliminate their exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... ALL 1-4

<u>Equipment Types</u>	<u>Wear or Use (Y/N)</u>
Respirators	<u>N</u>
Safety goggles/glasses	<u>Y</u>
Face shields	<u>N</u>
Coveralls	<u>N</u>
Bib aprons	<u>N</u>
Chemical-resistant gloves	<u>Y</u>
Other (specify)	
<u>N/A</u>	

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☐ Mark (X) this box if you attach a continuation sheet.

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- 9.15 If workers use respirators when working with the listed substance, specify for each process type, the work areas where the respirators are used, the type of respirators used, the average usage, whether or not the respirators were fit tested, and the type and frequency of the fit tests. Photocopy this question and complete it separately for each process type.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

<u>Work Area</u>	<u>Respirator Type</u>	<u>Average Usage<sup>1</sup></u>	<u>Fit Tested (Y/N)</u>	<u>Type of Fit Test<sup>2</sup></u>	<u>Frequency of Fit Tests (per year)</u>
1-4	N/A				

<sup>1</sup>Use the following codes to designate average usage:

A = Daily  
B = Weekly  
C = Monthly  
D = Once a year  
E = Other (specify) \_\_\_\_\_

<sup>2</sup>Use the following codes to designate the type of fit test:

QL = Qualitative  
QT = Quantitative

☐ Mark (X) this box if you attach a continuation sheet.

PART E WORK PRACTICES

- 9.19 Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this question and complete it separately for each process type and work area.

CBI

☐

Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 1

BULK UNLOADING - LIMITED ACCESS; WORKER TRAINING MARKED/COLOR CODED CONNECTIONS

TDI STORAGE TANK - PLACARDED, CONTINUOUS AREA MONITOR, LIMITED ACCESS, TRAINING

- 9.20 Indicate (X) how often you perform each housekeeping task used to clean up routine leaks or spills of the listed substance. Photocopy this question and complete it separately for each process type and work area.

Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 1

Housekeeping Tasks	Less Than Once Per Day	1-2 Times Per Day	3-4 Times Per Day	More Than 4 Times Per Day
Sweeping	NA	NA	NA	NA
Vacuuming	NA	NA	NA	NA
Water flushing of floors	NA	NA	NA	NA
Other (specify)				
NEUTRALIZE/ABSORB.	AS NEEDED	NA	NA	NA

☐ Mark (X) this box if you attach a continuation sheet.



**PART E WORK PRACTICES**

- 9.19** Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this question and complete it separately for each process type and work area.

CBI

☐

Process type ..... TDI PREPOLYMER MANUFACURING PROCESS

Work area ..... 2

AUTOMATIC EXPOSURE MONITORING

LIMITED ACCESS

TRAINING PROGRAM

CLOSED, DEDICATED PIPING

- 9.20** Indicate (X) how often you perform each housekeeping task used to clean up routine leaks or spills of the listed substance. Photocopy this question and complete it separately for each process type and work area.

Process type ..... TDI PROPOLYMER MANUFACTURING PROCESS

Work area ..... 2

<u>Housekeeping Tasks</u>	<u>Less Than Once Per Day</u>	<u>1-2 Times Per Day</u>	<u>3-4 Times Per Day</u>	<u>More Than 4 Times Per Day</u>
<b>Sweeping</b>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<b>Vacuuuming</b>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<b>Water flushing of floors</b>	<u>X</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<b>Other (specify)</b>				
<u>NEUTRALIZE/ABSORB.</u>	<u>AS NEEDED</u>	<u>AS NEEDED</u>	<u>NA</u>	<u>NA</u>

☐ Mark (X) this box if you attach a continuation sheet.

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**PART E WORK PRACTICES**

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- 9.19 Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this question and complete it separately for each process type and work area.

CBI

☐

Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 3

LIMITED ACCESS

WORKER TRAINING

CONTAINER INSPECTION FOR LEAKERS

CONTAINER LABELS

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- 9.20 Indicate (X) how often you perform each housekeeping task used to clean up routine leaks or spills of the listed substance. Photocopy this question and complete it separately for each process type and work area.

Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 3

<u>Housekeeping Tasks</u>	<u>Less Than Once Per Day</u>	<u>1-2 Times Per Day</u>	<u>3-4 Times Per Day</u>	<u>More Than 4 Times Per Day</u>
<u>Sweeping</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>Vacuuming</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>Water flushing of floors</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>Other (specify)</u>				
<u>NEUTRALIZE/ABSORB.</u>	<u>AS NEEDED</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

---

☐ Mark (X) this box if you attach a continuation sheet.

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**PART E WORK PRACTICES**

- 9.19 Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this question and complete it separately for each process type and work area.

CBI

☐

Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 4

WORKER TRAINING

SAMPLE LABELS

LIMITED ACCESS

- 9.20 Indicate (X) how often you perform each housekeeping task used to clean up routine leaks or spills of the listed substance. Photocopy this question and complete it separately for each process type and work area.

Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Work area ..... 4

<u>Housekeeping Tasks</u>	<u>Less Than Once Per Day</u>	<u>1-2 Times Per Day</u>	<u>3-4 Times Per Day</u>	<u>More Than 4 Times Per Day</u>
<b>Sweeping</b>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<b>Vacuuming</b>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<b>Water flushing of floors</b>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<b>Other (specify)</b>				
<u>NEUTRALIZE/ABSORB</u>	<u>NA</u>	<u>AS NEEDED</u>	<u>NA</u>	<u>NA</u>

☐ Mark (X) this box if you attach a continuation sheet.

9.21 Do you have a written medical action plan for responding to routine or emergency exposure to the listed substance?

Routine exposure

Yes ..... 1

No ..... 2

Emergency exposure

Yes ..... 1

No ..... 2

If yes, where are copies of the plan maintained?

Routine exposure: \_\_\_\_\_

Emergency exposure: \_\_\_\_\_

9.22 Do you have a written leak and spill cleanup plan that addresses the listed substance? Circle the appropriate response.

Yes ..... ①

No ..... 2

If yes, where are copies of the plan maintained? PLANT MANAGERS OFFICE

Has this plan been coordinated with state or local government response organizations? Circle the appropriate response.

Yes ..... ①

No ..... 2

9.23 Who is responsible for monitoring worker safety at your facility? Circle the appropriate response.

Plant safety specialist ..... 1

Insurance carrier ..... 2

OSHA consultant ..... 3

Other (specify) \_\_\_\_\_ ..... 4

☐ Mark (X) this box if you attach a continuation sheet.

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## SECTION 10 ENVIRONMENTAL RELEASE

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### General Instructions:

Complete Part E (questions 10.23-10.35) for each non-routine release involving the listed substance that occurred during the reporting year. Report on all releases that are equal to or greater than the listed substance's reportable quantity value, RQ, unless the release is federally permitted as defined in 42 U.S.C. 9601, or is specifically excluded under the definition of release as defined in 40 CFR 302.3(22). Reportable quantities are codified in 40 CFR Part 302. If the listed substance is not a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and, thus, does not have an RQ, then report releases that exceed 2,270 kg. If such a substance however, is designated as a CERCLA hazardous substance, then report those releases that are equal to or greater than the RQ. The facility may have answered these questions or similar questions under the Agency's Accidental Release Information Program and may already have this information readily available. Assign a number to each release and use this number throughout this part to identify the release. Releases over more than a 24-hour period are not single releases, i.e., the release of a chemical substance equal to or greater than an RQ must be reported as a separate release for each 24-hour period the release exceeds the RQ.

For questions 10.25-10.35, answer the questions for each release identified in question 10.23. Photocopy these questions and complete them separately for each release.

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### PART A GENERAL INFORMATION

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10.01 Where is your facility located? Circle all appropriate responses.

#### CBI

- ☐ Industrial area ..... 1
- Urban area ..... 2
- Residential area ..... 3
- Agricultural area ..... 4
- Rural area ..... 5
- Adjacent to a park or a recreational area ..... 6
- Within 1 mile of a navigable waterway ..... 7
- Within 1 mile of a school, university, hospital, or nursing home facility ..... 8
- Within 1 mile of a non-navigable waterway ..... 9
- Other (specify) \_\_\_\_\_ 10

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☐ Mark (X) this box if you attach a continuation sheet.

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10.02 Specify the exact location of your facility (from central point where process unit is located) in terms of latitude and longitude or Universal Transverse Mercader (UTM) coordinates.

Latitude ..... 39 ° 37 ' 18 "

Longitude ..... 75 ° 51 ' 21 "

UTM coordinates ..... Zone \_\_\_\_\_, Northing \_\_\_\_\_, Easting \_\_\_\_\_

10.03 If you monitor meteorological conditions in the vicinity of your facility, provide the following information.

Average annual precipitation ..... inches/year

Predominant wind direction .....

10.04 Indicate the depth to groundwater below your facility.

Depth to groundwater ..... meters

10.05 For each on-site activity listed, indicate (Y/N/NA) all routine releases of the listed substance to the environment. (Refer to the instructions for a definition of CBI Y, N, and NA.)

On-Site Activity	Environmental Release		
	Air	Water	Land
Manufacturing	NA	NA	NA
Importing	NA	NA	NA
Processing	Y	N	N
Otherwise used	NA	NA	NA
Product or residual storage	N	N	N
Disposal	NA	NA	NA
Transport	NA	NA	NA

☐ Mark (X) this box if you attach a continuation sheet.

10.06 Provide the following information for the listed substance and specify the level of precision for each item. (Refer to the instructions for further explanation and an example.)

CBI

☐

Quantity discharged to the air .....	<u>7</u>	kg/yr $\pm$ <u>20</u> %
Quantity discharged in wastewaters .....	<u>NA</u>	kg/yr $\pm$ <u>   </u> %
Quantity managed as other waste in on-site treatment, storage, or disposal units .....	<u>900</u>	kg/yr $\pm$ <u>20</u> %
Quantity managed as other waste in off-site treatment, storage, or disposal units .....	<u>NA</u>	kg/yr $\pm$ <u>   </u> %

☐ Mark (X) this box if you attach a continuation sheet.

10.08 Describe the control technologies used to minimize release of the listed substance for each process stream containing the listed substance as identified in your process block or residual treatment block flow diagram(s). Photocopy this question and complete it separately for each process type.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

<u>Stream ID Code</u>	<u>Control Technology</u>	<u>Percent Efficiency</u>
7L	NONE	
7M	NONE	
7N	NONE	
7Ø	NONE	

☐ Mark (X) this box if you attach a continuation sheet.



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PART B RELEASE TO AIR

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- 10.09 Point Source Emissions -- Identify each emission point source containing the listed substance in terms of a Stream ID Code as identified in your process block or residual treatment block flow diagram(s), and provide a description of each point source. Do not include raw material and product storage vents, or fugitive emission sources (e.g., equipment leaks). Photocopy this question and complete it separately for each process type.

CBI

☐

Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Point Source  
ID Code

Description of Emission Point Source

7N

REACTOR VENT

7ø

VENT FANS FOR CONTAINER FILLING

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☐ Mark (X) this box if you attach a continuation sheet.

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☐ Mark (X) this box if you attach a continuation sheet.

114

10.10 Emission Characteristics - - Characterize the emissions for each Point Source ID Code identified in question 10.09 by completing the following table.

☒

☐

Point Source ID Code	Physical State	Average Emissions (kg/day)	Frequency <sup>2</sup> (days/yr)	Duration <sup>3</sup> (min/day)	Average Emission Factor <sup>4</sup>	Maximum Emission Rate (kg/min)	Maximum Emission Rate Frequency (events/yr)	Maximum Emission Rate Duration (min/event)
7N	V	0.0023	150	180	0.0000002	0.000012	150	180
20	V	0.000001	150	240	0.00000 000012	0.0000 00004	150	240

<sup>1</sup>Use the following codes to designate physical state at the point of release:  
G = Gas; V = Vapor; P = Particulate; A = Aerosol; O = Other (specify) \_\_\_\_\_

<sup>2</sup>Frequency of emission at any level of emission

<sup>3</sup>Duration of emission at any level of emission

<sup>4</sup>Average Emission Factor — Provide estimated ( $\pm$  25 percent) emission factor (kg of emission per kg of production of listed substance)

10.11 Stack Parameters -- Identify the stack parameters for each Point Source ID Code identified in question 10.09 by completing the following table.

CBI

☐

Point Source ID Code	Stack Height(m)	Stack Inner Diameter (at outlet) (m)	Exhaust Temperature (°C)	Emission Exit Velocity (m/sec)	Building Height(m) <sup>1</sup>	Building Width(m) <sup>2</sup>	Vent, Type <sup>3</sup>
7N	7	0.051	25	UK	7.6	36.6	V
7Ø	8.2	0.2	25	UK	7.6	36.6	V

<sup>1</sup>Height of attached or adjacent building

<sup>2</sup>Width of attached or adjacent building

<sup>3</sup>Use the following codes to designate vent type:

H = Horizontal

V = Vertical

☐ Mark (X) this box if you attach a continuation sheet.

10.12 If the listed substance is emitted in particulate form, indicate the particle size distribution for each Point Source ID Code identified in question 10.09. Photocopy this question and complete it separately for each emission point source.

CBI

☐

(N/A)

Point source ID code .....

Size Range (microns)

Mass Fraction (% ± % precision)

< 1

≥ 1 to < 10

≥ 10 to < 30

≥ 30 to < 50

≥ 50 to < 100

≥ 100 to < 500

≥ 500

Total = 100%

☐ Mark (X) this box if you attach a continuation sheet.

# PART C FUGITIVE EMISSIONS

10.13 Equipment Leaks -- Complete the following table by providing the number of equipment types listed which are exposed to the listed substance and which are in service according to the specified weight percent of the listed substance passing through the component. Do this for each process type identified in your process block or residual treatment block flow diagram(s). Do not include equipment types that are not exposed to the listed substance. If this is a batch or intermittently operated process, give an overall percentage of time per year that the process type is exposed to the listed substance. Photocopy this question and complete it separately for each process type.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Percentage of time per year that the listed substance is exposed to this process type ..... 60 %

Equipment Type	Number of Components in Service by Weight Percent of Listed Substance in Process Stream					Greater than 99%
	Less than 5%	5-10%	11-25%	26-75%	76-99%	
Pump seals <sup>1</sup>						
Packed	0	0	0	2	0	0
Mechanical	0	0	0	0	0	0
Double mechanical <sup>2</sup>	0	0	0	0	0	0
Compressor seals <sup>1</sup>	0	0	0	0	0	0
Flanges	0	0	0	0	0	3
Valves						
Gas <sup>3</sup>	0	0	0	0	0	0
Liquid	0	0	0	8	0	2
Pressure relief devices <sup>4</sup> (Gas or vapor only)	0	0	0	1	0	0
Sample connections						
Gas	0	0	0	0	0	0
Liquid	0	0	0	1	0	0
Open-ended lines <sup>5</sup> (e.g., purge, vent)						
Gas	0	0	0	0	0	0
Liquid	0	0	0	0	0	0

<sup>1</sup>List the number of pump and compressor seals, rather than the number of pumps or compressors

10.13 continued on next page

☐ Mark (X) this box if you attach a continuation sheet.

**10.13 (continued)**

<sup>2</sup>If double mechanical seals are operated with the barrier (B) fluid at a pressure greater than the pump stuffing box pressure and/or equipped with a sensor (S) that will detect failure of the seal system, the barrier fluid system, or both, indicate with a "B" and/or an "S", respectively

<sup>1</sup>Conditions existing in the valve during normal operation

Report all pressure relief devices in service, including those equipped with control devices

<sup>5</sup>Lines closed during normal operation that would be used during maintenance operations

10.14 Pressure Relief Devices with Controls -- Complete the following table for those pressure relief devices identified in 10.13 to indicate which pressure relief devices in service are controlled. If a pressure relief device is not controlled, enter "None" under column c.

□

[illegible]

<sup>1</sup>Refer to the table in question 10.13 and record the percent range given under the heading entitled "Number of Components in Service by Weight Percent of Listed Substance" (e.g., <5%, 5-10%, 11-25%, etc.)

<sup>2</sup>The EPA assigns a control efficiency of 100 percent for equipment leaks controlled with rupture discs under normal operating conditions. The EPA assigns a control efficiency of 98 percent for emissions routed to a flare under normal operating conditions

☐ Mark (X) this box if you attach a continuation sheet.

- 10.15 Equipment Leak Detection -- If a formal leak detection and repair program is in place, complete the following table regarding those leak detection and repair procedures. Photocopy this question and complete it separately for each process type.

CBI

☐ Process type ..... TDI PREPOLYMER MANUFACTURING PROCESS

Equipment Type	Leak Detection Concentration (ppm or mg/m <sup>3</sup> ) Measured at 60 Inches from Source	Detection Device <sup>1</sup>	Frequency of Leak Detection (per year)	Repairs Initiated (days after detection)	Repairs Completed (days after initiated)
Pump seals					
Packed	0.02 PPM	FPM	DAILY	1	3
Mechanical	NA				
Double mechanical	NA				
Compressor seals	NA				
Flanges	0.02 PPM	FPM	DAILY	1	3
Valves					
Gas	NA				
Liquid	0.02 PPM	FPM	DAILY	1	3
Pressure relief devices (gas or vapor only)	NA				
Sample connections					
Gas	NA				
Liquid	0.02 PPM	FPM	DAILY	1	3
Open-ended lines					
Gas	NA				
Liquid	NA				

<sup>1</sup>Use the following codes to designate detection device:

POVA = Portable organic vapor analyzer

FPM = Fixed point monitoring

0 = Other (specify) \_\_\_\_\_

☐ Mark (X) this box if you attach a continuation sheet.

☐ Mark (X) this box if you attach a continuation sheet.

10.16 Raw Material, Intermediate and Product Storage Emissions - - Complete the following table by providing the information on each liquid raw material, intermediate, and product storage vessel containing the listed substance as identified in your process block or residual treatment block flow diagram(s).

CM

☐

Vessel Type <sup>1</sup>	Floating Roof <sup>2</sup> Seals	Composition of Stored Materials <sup>3</sup>	Throughput (liters per year)	Vessel Filling Rate (gpm)	Vessel Filling Duration (min)	Vessel Inner Diameter (m)	Vessel Height (m)	Operating Volume (l)	Vessel Emission Controls <sup>4</sup>	Design Flow Rate <sup>5</sup>	Vent Diameter (cm)	Control Efficiency (%)	Basis for Estimate <sup>6</sup>
F	NA	100	118940	70	60	2.74	3.81	20439	NA	NA	5.1	NA	NA

<sup>1</sup>Use the following codes to designate vessel type:

- F = Fixed roof
- CIF = Contact internal floating roof
- NCIF = Noncontact internal floating roof
- EFR = External floating roof
- P = Pressure vessel (indicate pressure rating)
- H = Horizontal
- U = Underground

<sup>2</sup>Use the following codes to designate floating roof seals:

- MS1 = Mechanical shoe, primary
- MS2 = Shoe-mounted secondary
- MSZR = Rim-mounted, secondary
- LM1 = Liquid-mounted resilient filled seal, primary
- LM2 = Rim-mounted shield
- LMW = Weather shield
- VM1 = Vapor mounted resilient filled seal, primary
- VM2 = Rim-mounted secondary
- VMW = Weather shield

<sup>3</sup>Indicate weight percent of the listed substance. Include the total volatile organic content in parenthesis

<sup>4</sup>Other than floating roofs

<sup>5</sup>Gas/vapor flow rate the emission control device was designed to handle (specify flow rate units)

<sup>6</sup>Use the following codes to designate basis for estimate of control efficiency:

- C = Calculations
- S = Sampling



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**PART E NON-ROUTINE RELEASES**

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10.23 Indicate the date and time when the release occurred and when the release ceased or was stopped. If there were more than six releases, attach a continuation sheet and list all releases.

<u>Release</u>	<u>Date Started</u>	<u>Time (am/pm)</u>	<u>Date Stopped</u>	<u>Time (am/pm)</u>
<u>1</u>	<u>NONE</u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>2</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>3</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>4</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>5</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>6</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>

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10.24 Specify the weather conditions at the time of each release.

<u>Release</u>	<u>Wind Speed (km/hr)</u>	<u>Wind Direction</u>	<u>Humidity (%)</u>	<u>Temperature (°C)</u>	<u>Precipitation (Y/N)</u>
<u>1</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>2</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>3</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>4</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>5</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
<u>6</u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>

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☐ Mark (X) this box if you attach a continuation sheet.

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## APPENDIX I: List of Continuation Sheets

Attach continuation sheets for sections of this form and optional information after this page. In column 1, clearly identify the continuation sheet by listing the question number to which it relates. In column 2, enter the inclusive page numbers of the continuation sheet for each question number.

[illegible]

☐ Mark (X) this box if you attach a continuation sheet.